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IN THE
Supreme Court of the United States

PETRUS A.C.M. NUIJTEN,
Petitioner,

v.

JON DUDAS, Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office,
Respondent.

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

PETITION FOR A WRIT OF CERTIORARI

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QUESTION PRESENTED

Whether the U.S. Court of Appeals for the Federal Circuit erred by adding new requirements to 35 U.S.C. § 101 that patentable manufactures must be tangible articles that are nontransitory and perceivable without special equipment, thereby denying patent protection to all signals and other important advances in technology that do not meet these new requirements, no matter how innovative, unique, or useful they are.

PARTIES TO THE PROCEEDING

Pursuant to Rule 14.1(b), the following list identifies all of the parties appearing here and before the U.S. Court of Appeals for the Federal Circuit:

The petitioner here and appellant below is Petrus A.C.M. Nuijten and the real party in interest is U.S. Philips Corporation.

The respondent here and appellee below is Jon Dudas, in his capacity as Director of the United States Patent and Trademark Office.

RULE 29.6 STATEMENT

All parent corporations and publicly held companies that own 10 percent or more of the stock of U.S. Philips Corporation are: Philips Holding U.S.A., Inc. and Koninklijke Philips Electronics N.V. (aka Royal Philips Electronics N.V.).

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The opinion of the U.S. Court of Appeals for the Federal Circuit (Pet. App. 1a-51a) is reported at *In re Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007). The opinion of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Pet. App. 52a-68a) is available at *Ex parte PETRUS A.C.M. NUIJTEN*, 2006 WL 3939192, 2006 Pat. App. LEXIS 50, 84 U.S.P.Q.2D (BNA) 1335 (Pat. App. 2006). The Federal Circuit's denial of rehearing and rehearing en banc (Pet. App. 69a-72a) is available at *In re Petrus A.C.M. Nuijten*, 515 F.3d 1361, 85 U.S.P.Q.2d 1927 (Fed. Cir. 2008).

JURISDICTION

The Federal Circuit denied the petition for rehearing and rehearing en banc on February 11, 2008. Pet. App. 69a-70a. Judges Linn, Newman, and Rader dissented. Pet. App. 70a-72a. This Court has jurisdiction under 28 U.S.C. § 1254 (1).

STATUTORY PROVISION INVOLVED

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." 35 U.S.C. § 101 (2007).

STATEMENT OF THE CASE

More than 200 years after the statutory language was adopted, the United States Court of Appeals for the Federal Circuit has significantly narrowed the scope of patentable subject matter and denied effective patent protection for new technologies. The Federal Circuit did this by improperly adding three new criteria for determining whether an invention is a patentable manufacture. In direct contravention of this Court's precedent, Congressional intent, and sound policy considerations, an invention now must be (1) a tangible article that is (2) nontransitory and (3) capable of being perceived without special equipment. These new requirements will stifle innovation by denying patent protection for all communications signals and many other advanced technologies. These new criteria for patentability are not in the Patent Act and are contrary to the

decisions of this Court. They are also vague, and will breed litigation due to uncertainty.

Although the drafters of the original Patent Act might not have been able to envision many of today's specific advances in communications, biotechnology, nanotechnology, and other fields, they drafted what has become Section 101 to provide patent protection for such future technologies.[1] The Federal Circuit's new criteria undermine the Constitutional purpose of the patent system, which is to promote the progress of the useful arts. The patent system accomplishes that objective by granting protection for inventions that advance the state of knowledge. As recognized in this Court's precedents, Section 101 of the Patent Act was purposefully drafted to provide patent protection for

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[1] Subsequent patent statutes have used much the same broad language as the original Act promulgated in 1790 and first amended in 1793. *See* An Act to Promote the Progress of Useful Arts, 1 Cong. Ch. 7; 1 Stat. 109 (1790) (allowing patents for "any useful art, manufacture, engine, machine, or device"); An Act to Promote the Progress of Useful Arts, 2 Cong. Ch. 11; 1 Stat. 318 (1793) (allowing patents for "any new and useful art, machine, manufacture or composition of matter"). The category "manufacture"—the part of the statute at issue here—has been included without modification since the original Act. *Id.* The 1952 Act broadened the statutory categories by including the word "art" within its broader definition of the category "process." *See* 35 U.S.C. § 100(b) (2007).

future innovation across the full spectrum of man's technological ingenuity, by allowing patents for any new and useful process, machine, manufacture, or composition of matter. A hallmark of modern progress is the extension of technology into physical realms that lie beyond unaided human sensory perception. We can now harness and regulate electrical, magnetic, biochemical, and other physical qualities that were unknown and unknowable to 18th and 19th century technologists.

The Federal Circuit's decision to add new limits on the scope of patentable subject matter will have a detrimental effect on American innovation. Under the Federal Circuit's new criteria, physical inventions that are invisible or short-lived will not be considered patentable manufactures, regardless of how novel they are, how useful they are, and how much their disclosure contributes to society's collective knowledge. Without effective patent protection, innovators will be less likely to spend research and development resources on technologies that will not meet the new criteria. If they do create such technologies, inventors will be forced to choose to either forgo patent protection completely and conceal their inventions as trade secrets, or obtain patents that protect only visible, tangible, and nontransitory forms of their invention while leaving fundamental aspects unprotected. The net result undermines the very purposes of the patent system,

which are to stimulate innovation and to entice inventors to publicly disclose their innovations in return for full patent protection. Inventors of new technologies should be able to protect the full scope of their inventions, not have their protection crippled by new limitations the Federal Circuit has grafted onto Section 101.

The Federal Circuit's new criteria categorically deny patent protection to all signals, which are key components of any communications system. The new patentability criteria also reach well beyond communications technologies. They will deny effective patent protection to a host of other technological inventions that are man-made and physical, yet cannot be seen or touched in the traditional sense; whose existence is not permanent; or that require instruments or equipment to be recorded and measured. Chemical intermediates, metastable polymorphs, advances in nanotechnology, and other transitory or invisible inventions could well be considered unpatentable. For example, a wide swath of inventions in pioneering fields could be denied patent protection simply because they are only sensed with the help of electronic, chemical, or optical equipment.

To preserve this Court's precedents, the intended purpose of the Patent Act and the patent system, and the broad societal benefits of patent

protection for modern technologies, this Court should grant certiorari.

Factual Background

Digital watermarks are used by publishers of sound and video recordings to embed information such as copyright or ownership information within their program content. Much like a watermark on paper, a digital watermark is embedded in the background of a signal, such as a digital audio or video file, to convey information. The watermark is typically hidden from normal users and casual copyists, but is designed to be extracted through software capable of analyzing the signal.

Unfortunately, a watermark often introduces noise and distortion to the signal that can impact the quality and enjoyment of the program by the user. "A key goal of watermarking techniques is to minimize the distortion so that the resulting diminution in signal quality is as minimal as possible." Pet. App. 2a. Mr. Nuijten invented a unique watermarked signal, manufactured by a new technique that compensates for the watermark.[2] Mr. Nuijten's invention greatly decreases the distortion and loss of signal quality due to the watermark. Pet. App. 7a.

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[2] Petitioner, Mr. Nuijten (pronounced "knight-en"), is a prolific inventor of nine U.S. patents.

Proceedings Below

The Patent Office determined that Mr. Nuijten had made a novel and nonobvious invention, and allowed Mr. Nuijten's claims for the process of creating the signal, a device that performs the process, and a storage medium containing the signal. Pet. App. 68a; Pet. App. 7a-8a. But the Patent Office Board of Appeals and Interferences rejected Mr. Nuijten's claims to the signal *per se* solely on the basis of unpatentability under Section 101 of the Patent Act. Pet. App. 57a-64a; Pet. App. 1a. An example of the denied "signal" claims is as follows:

> A signal with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the [s]upplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.

Pet. App. 53a (emphasis added). Mr. Nuijten timely appealed that decision to the Federal Circuit, which had jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

A two-to-one majority of the Federal Circuit panel below held that Mr. Nuijten's signal does not

fall within any of the four categories of patentable subject matter that are listed in 35 U.S.C. § 101: process, machine, manufacture, or composition of matter.

In construing the scope of Mr. Nuijten's signal claims as a matter of law, the panel below unanimously agreed that Mr. Nuijten's claimed signals were physical inventions: "A 'signal' implies signaling—that is, the conveyance of information. To convey information to a recipient a physical carrier, such as an electromagnetic wave, is needed." Pet. App. 12a; *see also* Pet. App. 25a.

The majority also acknowledged that signals are "man-made, in the sense of having been encoded, generated, and transmitted by artificial means" (Pet. App. 19a) and that a signal is "physical—it exists in the real world and has tangible causes and effects . . ." (Pet. App. 20a). The majority held, however, that signals are unpatentable and not manufactures because they are not **tangible articles**, they are transitory, and they can only be perceived through the use of special equipment. Pet. App. 20a-22a. The majority concluded that its decision was supported by a dictionary definition of the word manufacture that was discussed by this Court in *American Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1 (1931), and *Diamond v. Chakrabarty*, 447 U.S. 303 (1980). Pet. App. 19a-20a.

Judge Linn dissented, arguing that Mr. Nuijten's signal is patentable as a new and useful manufacture.[3] Judge Linn's dissent recognized that "[t]his case presents challenging questions that go beyond the single patent claim at issue." Pet. App. 25a.

Judge Linn found that Mr. Nuijten's signal was a patentable manufacture for five reasons. First, the dictionary definitions cited by the majority do not require a manufacture to be a tangible article. Pet. App. 28a. Even if they did, something can be an article even though it is transitory or can only be detected using equipment. Pet. App. 29a. In fact, he noted that a prior Federal Circuit decision "squarely held that transitory inventions are patentable under § 101." Pet. App. 29a. Second, he noted that Mr. Nuijten's signal is not as transitory or "fleeting" as the majority suggests, because the signal itself could last for hours or be inscribed on paper and "last indefinitely." Pet. App. 30a. Third, he explained that neither *American Fruit* nor *Chakrabarty* held that a manufacture must be a tangible article. Pet. App. 30a-31a. Fourth, he noted that dictionaries contemporaneous with enactment of the Patent Act illustrate that manufacture was meant to be a broad term that covers any result of technological innovation, including Petitioner's signals. Pet. App.

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[3] Petitioner also contends that his signal is patentable under the statutory categories as a "process" and a "machine."

31a-34a. Finally, he argued that the majority was incorporating limitations on patentable subject matter that conflict with this Court's decision in *Chakrabarty*. Pet. App. 36a-37a.

Mr. Nuijten petitioned the Federal Circuit to rehear his case en banc. The petition was denied. Pet. App. 69a-70a. Judges Linn, Newman, and Rader dissented from the denial of en banc treatment, stating:

> [The panel opinion] conflicts with Supreme Court precedent because it ignores the Supreme Court's analysis of how, in general terms, §101 is to be construed. As the Court discussed in *Diamond v. Chakrabarty*, patentable subject matter includes "anything under the sun that is made by man" except for certain enumerated exceptions: "The laws of nature, physical phenomena, and abstract ideas have been held not patentable." 447 U.S. 303, 309 (1980). The majority's narrow construction of "manufacture" ignores this framework.

Pet. App. 70a-71a.

REASONS FOR GRANTING THE WRIT

Because the Federal Circuit has national appellate jurisdiction over all patent cases, other circuit courts cannot serve as a check if the Federal Circuit creates doctrinal error in patent law. *See* Eugene Gressman et al., Supreme Court Practice 255 (9th Ed. 2007). Rather, in increasing instances in recent years, this Court has granted certiorari over Federal Circuit patent decisions in two circumstances: first, where the issue presented is important because it has broad practical application; and second, where the Federal Circuit's decision conflicts with prior decisions of this Court. *See, e.g., eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006); *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007); *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118 (2007); *see also* Gressman, *supra*, at 123 (even absent a conflict, "[t]he Supreme Court has granted certiorari to review Federal Circuit decisions that have . . . raised important issues of federal law").

This case is important because the Federal Circuit improperly introduced three new criteria for patentability that will deny patents not only to signals and other communications technologies, but to many other cutting-edge inventions that are not tangible articles, that are transitory, or that require equipment to be perceived. The new criteria have no support in the language of Section 101 or in any earlier versions of the Patent Act, they have no

sound economic rationale, and they will undermine the purpose of the patent system. These vague new criteria will serve only to sow uncertainty and breed further litigation.

The Federal Circuit's decision also contradicts this Court's precedent. The Federal Circuit's new criteria contravene the holding of *Chakrabarty* that a patentable manufacture should "include anything under the sun that is made by man." 447 U.S. at 309. The Federal Circuit's decision also directly contradicts *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 86 (1853), which upheld the patentability of a signal claim related to Morse code. The Federal Circuit decision also contradicts the broad definitions of manufacture in *American Fruit* and in dictionaries contemporaneous with the original Patent Act. Finally, the Federal Circuit's decision undermines Congressional intent by denying patents to innovative technologies. Because the Patent Act was originally drafted to provide full protection to both present and future technologies, any new restrictions on the scope of patentable subject matter should come from Congress, not the Courts.

We will address first how the Federal Circuit's decision conflicts with this Court's precedent and the statutory language, then discuss why this case is important to technological advances.

I. The Decision Below Conflicts With Prior Decisions Of This Court And The Statutory Language

The conflicts between the decision below and this Court's precedent warrant certiorari. The decision directly conflicts with the Constitutional purpose of the patent system and the intent of Congress, as set forth by this Court in *Chakrabarty*. It also conflicts with this Court's decision in *Morse*, which upheld the patentability of a signal claim related to Morse code. Finally, the decision below conflicts with Congressional intent in passing the original Patent Act, as evidenced by contemporaneous dictionary definitions.

A. The Federal Circuit's Decision Conflicts With *Chakrabarty* And *American Fruit*

The Constitutional purpose of the patent system is to promote the progress of the useful arts. U.S. Const., art. 1, § 8, cl. 8. Congress has implemented that Constitutional mandate by creating four broad, technology-agnostic categories of patentable subject matter: machine, manufacture, process, and composition of matter. 35 U.S.C. § 101 (2007). Whoever invents or discovers "any" new and useful invention that falls into one of those categories is entitled to patent protection. *Id.* As this Court held in *Chakrabarty*, "[i]n choosing such

expansive terms as 'manufacture' and 'composition of matter,' modified by the comprehensive 'any,' Congress plainly contemplated that the patent laws would be given wide scope." 447 U.S. at 308. Thus, the statutory categories "include anything under the sun that is made by man." *Id.* at 309 (citation omitted).

Chakrabarty specifically held that the broadly defined categories should accommodate pioneering technologies because "the inventions most benefiting mankind are those that push back the frontiers of chemistry, physics, and the like." *Id.* at 316 (citation and internal quotation omitted). Thus, "Congress employed broad general language in drafting §101 precisely because such inventions are often unforeseeable." *Id.* at 316. *Chakrabarty* specifically rejected "read[ing] into the patent laws limitations and conditions which the legislature has not expressed." *Id.* at 308. By adding three new criteria for patentability that are not in the Patent Act, the Federal Circuit has done precisely what *Chakrabarty* rejected.

The Federal Circuit majority nonetheless concluded that its decision was supported by this Court's decisions in *Chakrabarty* and *American Fruit*. In doing so, they improperly singled-out and relied on just one of the two dictionary definitions of manufacture recited in *American Fruit*, a definition that was later quoted by this Court in *Chakrabarty*.

From that fragmentary definition, the majority concluded that a manufacture must be a tangible article. Pet. App. 20a.

The majority's conclusion was erroneous. The *American Fruit* Court recited two definitions of manufacture from the Century Dictionary: "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by handlablor [sic] or by machinery" and "anything made for use from raw or prepared materials." 283 U.S. at 11 (citing 5 *Century Dictionary* 3620 (William Dwight Whitney ed., 1895).[4] Neither definition requires tangibility. Petitioner's signal indisputably satisfies the second definition, which does not require an "article." The majority of the Federal

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[4] *American Fruit* addressed whether chemical treatment of an orange with a borax impregnate effected a sufficient change to transform the naturally occurring fruit into a patentable manufacture. 283 U.S. at 11. There was no dispute that the borax-impregnated orange was a tangible article. But the Court held that the orange was not a manufacture because it did not possess "a new or distinctive form, quality, or property" from the original orange. *Id.* at 11-12. Thus, *American Fruit* only addressed the amount of transformation that is necessary to turn a pre-existing natural object into a patentable manufacture. It did not address the patentability of entirely new technological creations, such as Mr. Nuijten's signal, and it did not limit the definition of manufacture to encompass only "articles."

Circuit, however, ignored the broader second definition. *See* Pet. App. 19a; Pet. App. 29a.

In *Chakrabarty*, this Court cited the first portion of the *American Fruit* definition only as an example of an expansive definition, not to limit the full definition cited in *American Fruit*. *See* 447 U.S. at 308. As *Chakrabarty* explained, "[i]n choosing such expansive terms as 'manufacture' . . . modified by the comprehensive 'any,' Congress plainly contemplated that the patent laws would be given wide scope." *Id.* In fact, because the use of the word "any" in the statute "excludes selection or distinction," it would have been improper for the Court to select one of the dictionary definitions from *American Fruit* over the other. *See Citizens' Bank v. Parker*, 192 U.S. 73, 81 (1904). Therefore, the majority's decision is not only unsupported by *Chakrabarty* and *American Fruit*, but is instead in direct conflict with them.

B. The Federal Circuit's Decision Conflicts With *Morse*

The Federal Circuit majority decision is also in direct conflict with this Court's decision in *O'Reilly v. Morse* which affirmed the patentability of a claim to Mr. Morse's coded signal.

Mr. Morse "invented a new and useful improvement in the mode of communicating

information by signals, by the application of electro-magnetism." *Morse*, 56 U.S. (15 How.) at 84. He also invented machinery "which may be used to imprint signals upon paper or other suitable material . . . ." *Id.* at 85. The object of his invention was "the communication of intelligence at a distance by signs or signals." *Id.* at 87. Mr. Morse's signals allowed rapid, effective communications over long distances.

This Court held that Mr. Morse should receive a patent claim on his signal. *Morse*, 56 U.S. (15 How.) at 86. Mr. Morse's fifth patent claim reads as follows:

> Fifth. I claim, as my invention, the system of signs, consisting of dots and spaces, and of dots, spaces, and horizontal lines, for numerals, letters, words, or sentences, substantially as herein set forth and illustrated, for telegraphic purposes.

Id. (emphasis added). Mr. Morse's "system of signs" is the set of signals that he invented to represent letters and numerals. Mr. Morse uses the terms "signs" and "signals" interchangeably to describe the coded sequences of dots and dashes that are sent and recorded using his process. *See, e.g., id.* at 69 ("signs representing figures, letters, or words, might be legibly written down at any distance"); *id.* at 85 ("may be used to imprint signals upon paper or other

suitable material"); *id.* at 87 ("communicating intelligence at a distance by signs or signals"); *id.* at 88 ("by which means I am enabled to mark or print signs or signals upon paper or other fabric") (emphases added).

Mr. Morse was granted patent protection despite the fact that his signal was no more tangible or less transitory than Mr. Nuijten's signal, and was usually sent and received in a form that could not be detected by normal human perceptions, but rather required electromagnetic telegraph equipment.

As Judge Linn pointed out in his dissenting opinion, "[t]he 'system' and constituent 'signs' of Morse's fifth claim are not 'tangible articles or commodities.' . . . Rather the claim is directed to a signal—a particular way of encoding information so that it can be conveyed . . . in a useful manner at a distance." Pet. App. 51a (citation omitted). Just as Mr. Morse was allowed to patent the Morse Code signal that he invented, Mr. Nuijten should be allowed to patent his new signal. When the Federal Circuit majority decision held otherwise, it created a direct conflict with *Morse*.

The Federal Circuit majority decision in this case erroneously asserted that Morse's fifth claim was, in fact, a process claim covering the method (or "art") of signaling, with the true character of the claim being somewhat obscured by the "dated

language" of the claim. Pet. App. 22a-23a n.9. The majority contends that "[t]he written description of the patent describes Morse code as part of its description of the actual process of signaling" at pages 94-95 of the decision. *Id.* However, the passage cited by the majority does not suggest that Mr. Morse's fifth claim was to a "process." Instead, it describes the characters that form the claimed signal, and illustrates the process through which Mr. Morse's signal is created by pressing a "signal lever." *Morse*, 56 U.S. (15 How.) at 94-95. It is incorrect to describe the characters that are created by pressing the signal lever as a *process* for signaling.

Moreover, Morse's fifth claim cannot be recast as antiquated language for describing a process, because Mr. Morse's sixth claim expressly refers to his fifth claim as patenting "signals":

> Sixth. I also claim as my invention the system of signs, consisting of dots and spaces, and of dots, spaces, and horizontal lines, substantially as herein set forth and illustrated, in combination with machinery for recording them, as signals for telegraphic purposes.

Morse, 56 U.S. (15 How.) at 86 (emphasis added). There is little room to rationalize the **system of signs** recited in the fifth Morse code claim as an obscure recitation of process steps when those very

same signs are recorded **as signals** by the machinery of the very next claim.

C. The Federal Circuit's Decision Conflicts With The Original Meaning Of The Patent Act

The patentability of signals is confirmed by using dictionary definitions from the time the Patent Act was originally enacted. It is improper to read in new limitations that did not exist in contemporaneous definitions of language in the statute. *See, e.g., Smiley v. Citibank (S.D.), N.A,* 517 U.S. 735, 745 (1996) (refusing to read a limitation into the term "interest" in the National Bank Act because most legal dictionaries of the era did not contain that limitation); *see also St. Francis College v. Al-Khazraji*, 481 U.S. 604, 610-612 (1987).

The Patent Act was enacted in 1790 and first amended in 1793. The 1793 Patent Act, authored by Thomas Jefferson, embodied his philosophy that "ingenuity should receive a liberal encouragement." *Chakrabarty*, 447 U.S. at 308 (citation omitted). Jefferson's four broad statutory categories were "art, machine, manufacture, or composition of matter." *Id.* at 308. At the time the early versions of the Patent Act were drafted, "manufacture" was defined by the leading dictionary of the day as "[a]ny thing made by art." Samuel Johnson, *A Dictionary of the English Language* (3d ed. 1768). The word "art" was

defined as "[t]he power of doing something not taught by nature and instinct"; "[a] science"; "[a] trade"; "[a]rtfulness, skill, dexterity." *Id.* Just as this Court has used Dr. Johnson's dictionary to understand the original meaning of terms in the Constitution, drafted in 1787, *see Eldred v. Ashcroft*, 537 U.S. 186, 199 (2003) (using Dr. Johnson's definition of the word "limited" to interpret the Copyright Clause); *Utah v. Evans*, 536 U.S. 452, 475 (2002) (referring to Dr. Johnson's definition of "enumeration" to interpret the Census Clause), so too does Dr. Johnson's dictionary inform the meaning of terms in the original versions of the Patent Act.

The authors of the 1790 and 1793 Patent Acts were sufficiently prescient to adopt broad terms so that patentable intellectual property covers both the bricks-and-mortar world of that day and the more recent advent of the Internet and digital communications techniques that have changed the landscape for 21st century innovation, engineering, and high technology manufacturing. As companies continue to invent, manufacture, and market more advanced products, they need this Court's guidance to reaffirm the intent of the drafters of the Constitution and the Patent Act to ensure that our society's most useful and novel innovations receive full and economically effective patent protection. Mr. Nuijten's case thus provides an opportunity for this Court to reaffirm the Constitutional principles and

Congressional intent underlying Section 101 of the Patent Act, as enunciated in *Chakrabarty* almost thirty years ago.

The Federal Circuit's three new requirements, created more than 200 years after the Patent Act was first enacted, contradict the breadth of Dr. Johnson's definition of manufacture. Mr. Nuijten's signal is a "thing made by art" in the traditional Jeffersonian sense. The signal is man-made and physical, not taught by nature and instinct. It is not a law of nature, a naturally occurring physical phenomenon, nor an abstract idea.[5] A signal is an information carrier that, by definition, requires some physical manifestation. *See* Pet. App. 12a; Pet. App. 49a. Mr. Nuijten's signal is, simply put, a manufacture as that term was defined by Dr. Johnson and incorporated into the Patent Act by Thomas Jefferson.

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[5] Mr. Nuijten's signal is a physical technological invention. Like all signals, it is a physical container for conveying information—the signal is not itself abstract information. Thus, the claim at issue here is very different from mathematical and "business method" claims, which are often criticized for being abstract ideas and nothing more. The Federal Circuit has announced that it will clarify the scope of "process" claims under Section 101 by hearing en banc a recent decision involving a business method of managing risk. *In re Bilski*, No. 2007-1130 (Fed. Cir. Feb. 15, 2008). But *Bilski* will not address the interpretation of a "manufacture" under Section 101.

II. This Case Is Important Because The Federal Circuit Created Three Indeterminate New Criteria That Will Deny Patent Protection To Many Innovative Technologies And Breed Litigation

This case is important because the Federal Circuit effectively added three new requirements to the Patent Act that will render unpatentable a broad range of technologies, including all signals, and will cause uncertainty and breed litigation. The potential impact of the Federal Circuit's decision has already generated extensive commentary from members of the patent bar, academia, and experts from various industries.[6]

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[6] *See, e.g.*, Kristen Osenga, *Ants, Elephant Guns, and Statutory Subject Matter*, 39 Ariz. St. L.J. 1087, 1090 (Winter 2007) ("And most recently, the Federal Circuit laid a solid foundation for Supreme Court review of subject-matter eligibility by issuing two opinions, *In re Nuijten* and *In re Comiskey*, that . . . seemingly change the § 101 landscape."); John F. Duffy, *In re Nuijten: Patentable Subject Matter, Textualism and the Supreme Court* (Feb. 5, 2007), *available at* http://patentlyo.com/patent/2007/02/in_re_nuijten_p.html ("[*Nuijten*] is about the fundamental approach to interpreting the Patent Act and the effect of the Supreme Court's recent interest in patent cases."); Cynthia M. Ho, *Lessons From Lab. Corp. of America Holdings v. Metabolite Labs., Inc.*, 23 Santa Clara Computer & High Tech. L.J. 463, 465 (2007) ("The appropriate scope of patentable subject matter is a prime topic

A. The New Federal Circuit Criteria Will Discourage Innovation

There are important characteristics of Mr. Nuijten's signal that are not contested in this case: (1) it is man-made (2) it is physical, (3) it is novel, and (4) it is useful. There is no logical reason to deny him patent protection.

Rather than granting Mr. Nuijten the patent protection he deserves, the Federal Circuit effectively created three new requirements for inventions to qualify for patent protection: they must now also be (1) tangible articles that are (2) non-transitory; and (3) measurable without resort to special equipment. These new criteria deny patent protection to all signals, and to numerous other 20th and 21st century technologies.

1. Tangible Article

The Federal Circuit panel unanimously found that a signal has tangible causes and effects because it must be able to be physically sensed and

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for consideration by courts and commentators alike."); Harold Wegner, *Wegner's Top 10 Patent Cases* 3-4 (July 16, 2007), http://www.patentlyo.com/patent/TopTenJuly16.pdf ("To the extent that the Federal Circuit issues a clear pronouncement *either way*, this may represent a vehicle for a Supreme Court test as to the limits of § 101 patent-eligibility . . . .").

measured. Pet. App. 20a-21a. A signal cannot otherwise convey information. Pet. App. 12a.

But the panel majority invented a new requirement that has no support in this Court's holdings or the language of Section 101: to be a manufacture, something must be a "tangible article[]" that one can touch and hold. Pet. App. 20a. Under that new requirement, whole fields of technology could be excluded from patent protection just because they can not be seen, heard, touched, or smelled in the traditional sense. As a result, companies will not invest in research and development in these fields, or if they do, they may decide to protect their inventions as trade secrets. Moreover, under the Federal Circuit's indeterminate standard, parties will often have to litigate to determine when something that is physical is not also a tangible article.

2. Nontransitory

This Court has never held that inventions must exist for some minimum period of time to be patentable. Nor can that requirement be found in the language of either Section 101 or any version of the Patent Act since 1790. Such a requirement serves only to sow doubt and confusion as to what is, and is not, patentable subject matter.

Indeed, in an earlier case, *In re Breslow*, the Federal Circuit held that transitory, unstable, and non-isolatable chemical intermediates can be patentable. 616 F.2d 516, 519 (C.C.P.A. 1980). In that case, the court refused to read a permanence requirement into the composition of matter category, particularly if the invention was useful in its transitory state:

> It appears to us that the PTO would read into [Section 101] a requirement that compositions of matter must be stable which is a relative term to say the least. We see no good reason to do so. It would appear that many compounds may find their greatest or even their sole utility in the fact that they are not stable. Certainly, in the invention at bar there is no reason to have the claimed compounds in a stable form so they can be bottled or tanked or otherwise stored. The preferred manner of using them is to produce them in situ, whereupon they exhibit their cross-linking activity, their only disclosed utility.

Id. at 521 (emphasis added). Like the chemical intermediate in *Breslow*, Mr. Nuijten's signal exists long enough to fulfill its utility, and should be patentable.

In fact, Mr. Nuijten's signal is not actually "fleeting." The watermark is embedded throughout the entire transmitted signal. When downloaded over a slow internet connection, a media file containing Mr. Nuijten's digital watermark could last for hours. As Judge Linn pointed out in his dissent, "[i]n many embodiments—for example, when the signal encodes an audio or video signal representing a symphony or a full-length motion picture that is being watched in real time—the transmission may be in progress for a significant period of time." Pet. App. 30a. Therefore, under the Federal Circuit's new requirement, the question of "how long" something must exist to be non-transitory will be a highly litigated issue. Deciding what is patentable based on how long it lasts in its shortest potential embodiment makes no sense.

Nothing physical lasts forever, as reflected in the well known phrase "ashes to ashes, dust to dust."[7] In *Breslow*, the intermediary composition of matter was in existence only long enough to be useful. Mr. Chakrabarty's oil-eating bacteria did not live forever, yet they were patentable. Like the patented inventions in *Breslow*, *Chakrabarty*, and

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[7] The phrase is from the Anglican Funeral Service. Church of England, Book of Common Prayer, Funeral Service, *available at* http://www.cofe.anglican.org/worship/liturgy/commonworship/texts/funeral/funeral.html#service.

Morse, Mr. Nuijten's signal exists long enough to fulfill its intended purpose.

Although the Federal Circuit's decision purports to be merely interpreting the definition of the word manufacture, the decision actually adds a new, vague requirement that creates a conflict between the statutory categories of composition of matter and manufacture. Under *Breslow* a composition of matter can be transitory; under *Nuijten* a manufacture cannot. Rather than clarifying the patent law, this decision simply adds confusion and will breed litigation.

3. No Special Equipment

The Federal Circuit also denies patentability to Mr. Nuijten's signal because it requires special equipment to be perceived. Pet. App. 20a-21a ("While such a transmission is man-made and physical . . . it . . . must be measured . . . by equipment capable of detecting and interpreting the signal."). Patents are granted for inventions that are, by definition, novel and nonobvious. Thus, they often require technologically advanced equipment to measure and use them. Morse code required special equipment to be sent and received over long distances. Mr. Chakrabarty's bacteria would require a microscope to be viewed.

Determining whether an invention requires special equipment to be perceived raises a potential issue that would cut across many patents. The most ubiquitous modern electronic devices send and receive signals. The Federal Circuit's suggestion that signals are not patentable because they require equipment to be perceived is indeterminate and will breed litigation.

Ironically, under the Federal Circuit's approach, a watermark that was less innovative than Mr. Nuijten's signal could be patentable. The commercial importance of Mr. Nuijten's invention stems from the fact that his novel digital watermark is *not* noticeable to the casual user; that is why the watermark must be perceived and extracted by "equipment capable of detecting and interpreting the signal." Pet. App. 21a. If a digital watermark used in a Disney movie repeated the phrase "Disney, Disney, Disney" in a quiet whisper to identify the originator of the content, it could be discerned by the human ear, but would distract and likely annoy a listener. Mr. Nuijten developed something better than that, and the Federal Circuit used that very reason to deny him patent protection.

B. The New Criteria Deny Patents For All Signals *Per Se*, No Matter How Novel And Useful

Under the Federal Circuit's criteria, signals *per se* can never be patented, regardless of how inventive and useful they are. To obtain some level of patent protection, inventors of signals that are encrypted, encoded, or compressed in novel ways will be forced to draft their claims to include a storage medium or other tangible apparatus. Such narrow claim drafting will reduce the scope of their patent protection and make inventors less likely to develop and disclose new signals.

For example, Mr. Nuijten's signal is useful in combating piracy of intellectual property. The principal commercial applications of digital watermark technology are tracing and suppressing copyright infringement and piracy of music and video programs, particularly on the Internet.[8] Musicians,

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[8] The International Chamber of Commerce (the "ICC") has found that "[t]he ease and speed of reproduction and transmission of digital content on the Internet have made it difficult for rightholders to control the distribution of their copyrighted works and to enforce their rights in the digital context . . . ." ICC, Current and Emerging Intellectual Property Issues for Business: A Roadmap for Business and Policymakers 48 (9th ed. 2008), *available at* http://www.iccwbo.org/uploadedFiles/ICC/policy/intellectual_property/pages/IP_Roadmap-2005.pdf. They also found that

entertainment companies, and other content creators can encode license information and other data into their transmissions using Mr. Nuijten's signal technology, without degrading the quality of the content for the end user.

The Patent Office granted Mr. Nuijten's claims to a process for generating the watermarked signal, a device for performing that process, and a storage medium containing the signal. But, unless Mr. Nuijten can directly claim and patent the signal itself, he will be unable to effectively protect his invention in today's globally distributed network environment and to thus receive the economic benefits that are necessary to encourage further research and full disclosure of inventions. Digital programs are often produced by groups of artists, technicians and service firms who collaborate and/or serially add their inputs to the finished products. Conventional apparatus and process claims often will not reach patent infringement in such distributed network environments, where neither the machine that generates the infringing signal, nor a storage medium containing the signal, may ever be located wholly within the United States.

"infringers are resourceful and have tried to structure their services in such a way so as to make it more difficult for rightsholders to enforce their rights, for example by using remote servers to avoid jurisdiction." *Id.*

When an inventor like Mr. Nuijten creates a novel type of communications signal, he or she should be able to claim the signal *per se*, and not simply a non-novel storage medium or other tangible article containing the novel signal. This is not just an issue of semantics—Mr. Nuijten will receive less protection from infringement by claiming his invention on a storage medium rather than as a signal. As Judge Linn explained, "[i]t is incongruous to treat an individual watching a movie containing the signal . . . in real time as any less of an infringer than someone watching the same movie after a short delay using the recording feature of, for example, a TiVo® digital video recorder." Pet. App. 46a. The only sure way for Mr. Nuijten to effectively protect his invention from "real time" infringement during transmission in the United States is to claim the signal itself.

Another example further highlights the difficulty of being forced to claim a novel signal on a storage medium. One of the key goals of communications technology is to increase transmission speeds. If an inventor develops a signal that results in faster data transfer rates than were ever previously achieved, that inventor should be able to patent the *communicated* signal, which embodies the inventive concept of faster transmission speed, rather than the *stored* signal, which does not have any transmission speed at all

because it is no longer propagating. The signal's sole utility occurs while it is being transmitted. That is the point in time when an infringer would use the technology, and thus that is the point in time when the inventor most needs patent protection.

The Federal Circuit's new criteria will be detrimental to innovation in the field of communications, because signals form the core of communication technology. Throughout history, advances in signaling technologies have been critical to the development of human society. As key components of any communication system, signals and signaling technologies are precisely the type of "useful arts" whose development should be promoted through the patent system. That is why Section 101 was drafted to provide non-tangible inventions, such as transmitted signals, the same patent protection as inventions that are tangible articles.

C. The New Criteria Contravene Public Policy By Encouraging Cutting-Edge Technology To Be Kept Secret

The current patentability rules of this Court are designed to navigate the "opposing and risky shoals" between patent overprotection and underprotection. *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 548 U.S. 124, 126 S.Ct. 2921, 2922 (Stevens, J., dissenting). In contrast, the three

new requirements invented by the Federal Circuit undermine the economic rationales for the patent system because they (1) deny inventors the ability to recoup their fixed costs of research and development and (2) encourage them to keep inventions secret. *See* W. Landes & R. Posner, The Economic Structure of Intellectual Property Law 294 (2003).

As this Court has noted, "the federal patent system . . . embodies a carefully crafted bargain for encouraging the creation and disclosure of new, useful, and nonobvious advances in technology and design in return for the exclusive right to practice the invention for a period of years." *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150-51 (1989). If the Federal Circuit's new requirements are left to stand, innovators are less likely to spend research and development resources on inventions that are not tangible articles, that are transitory, or that require special equipment to be perceived. If they do invent such technologies, they likely will keep their inventions secret. Inventors like Mr. Nuijten will "invest many more resources in maintaining trade secrecy . . . and inventive activity [will] be inefficiently biased toward inventions that can be kept secret." Landes & Posner at 328. The end result will be to "reduce[e] the stock of knowledge available to society as a whole." *Id.* at 294. Thus, the Federal Circuit's new criteria improperly disrupt the delicate economic balance

between patent overprotection and underprotection that has been established by Congress and upheld by this Court. By denying Mr. Nuijten's claims to the signal *per se*, the Federal Circuit has exalted form over substance and created new criteria that will deny patents to innovative technologies.

The Federal Circuit's decision below will affect a broad spectrum of unforeseen technological advances solely because they are intangible, transitory, or require special equipment to be perceived.[9] Chemical intermediates, metastable polymorphs, and other unstable compounds might now be considered too transitory to be patentable; inventions in nanotechnology, biotechnology, and other current fields could be denied patents because they are measured using special equipment.

Since its inception over 200 years ago, the patent system was purposefully created to be flexible enough to protect present and future advances in manufacturing and engineering technology. By adding new patentability criteria that restrict the broad patent protection envisioned by the original drafters of the Patent Act and upheld by this Court,

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[9] For example, patents have been granted to "optical tweezers" that are constructed solely from light and allow manipulation of very small particles. U.S. Patent No. 6,416,190, at [54] (filed Apr. 27, 2001). Yet such an invention might not be considered a tangible article, and thus would not be patentable under the Federal Circuit's reasoning.

the Federal Circuit has crippled effective patent protection for a large segment of American industry. This Court should grant certiorari so that modern technologies such as Mr. Nuijten's signal can be patented, effectively protected, and broadly shared through public disclosures.

CONCLUSION

The petition for certiorari should be granted.

Respectfully submitted,

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May 9, 2007

APPENDIX

APPENDIX A — OPINION OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT DATED SEPTEMBER 20, 2007

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

In re Petrus A.C.M. NUIJTEN.

No. 2006-1371.
Serial No. 09/211,928.

Sept. 20, 2007.

Before GAJARSA, LINN, and MOORE, Circuit Judges.

Opinion for the court filed by Circuit Judge GAJARSA. Opinion concurring-in-part and dissenting-in-part filed by Circuit Judge LINN.

GAJARSA, Circuit Judge.

The issue before the court is whether or not a signal is patentable subject matter. Petrus A.C.M. Nuijten appeals the decision of the Board of Patent Appeals and Interferences ("Board") of the United States Patent and Trademark Office ("PTO"), which rejected claims 14, 22, 23, and 24 in his patent application Serial No. 09/211,928 as unpatentable subject matter outside the scope of 35 U.S.C. § 101. The claims seek to patent any "signal" that has been encoded in a particular manner. Because we agree with the Board that the "signal" claims in Nuijten's application are not directed to statutory subject matter, we affirm.

Appendix A

I. BACKGROUND

A. *Nuijten's Invention and Patent Application*

Nuijten's patent application discloses a technique for reducing distortion induced by the introduction of "watermarks" into signals. In the context of signal processing, watermarking is a technique by which an original signal (such as a digital audio file) is manipulated so as to embed within it additional data. The additional data is preferably imperceptible to someone who views or listens to the signal-for instance, a listener who plays back a watermarked digital audio file would, if the watermark is sufficiently unobtrusive, not be able to distinguish between the watermarked and unwatermarked versions. However, an analysis of the file by software capable of detecting the watermark will reveal the mark's contents. This ability to encode additional data into a signal is useful to publishers of sound and video recordings, who can use watermarks to embed in the media they distribute information intended to protect that media against unauthorized copying. For these publishers and others, watermarking represents a trade-off: the desired additional data is encoded directly into the signal, but like any change to a signal, the watermark introduces some level of distortion. Thus, a key goal of watermarking techniques is to minimize the distortion so that the resulting diminution in signal quality is as minimal as possible.

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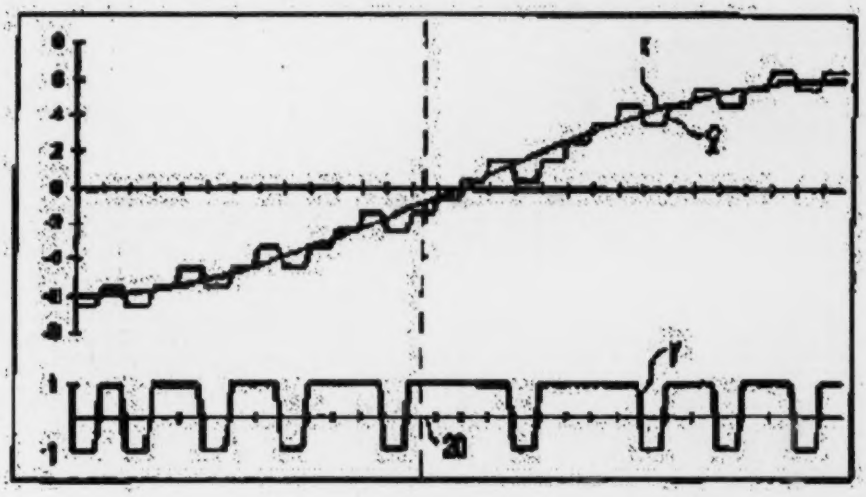
Nuijten's technique improves existing watermark technology by further modifying the watermarked signal in a way that partially compensates for distortion introduced by the watermark. A helpful illustration is found in the diagrams of Nuijten's application:



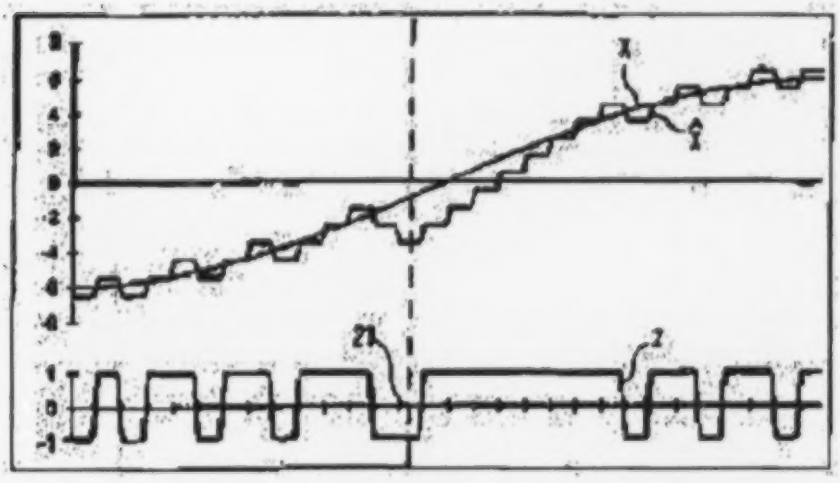
This diagram, Figure 2 of the application, demonstrates a relatively simple form of digital audio encoding called "delta modulation."[1] The smooth line in the upper graph (labeled 'x') represents a very small slice of the sound wave to be encoded. The lower graph represents a digital encoding of that signal. It takes on only two values. They are labeled here as '1' and '–1,' rather than the usual labeling of these binary values as

1. More complex forms of encoding are also discussed in Nuijten's patent application. For simplicity, we focus here on delta modulation.

one and zero. The sound wave is reconstructed from the digital signal one step at a time, left to right. If the digital signal has value '1,' the reconstructed sound wave's value is increased slightly, and if the digital signal has value '–1,' the sound wave is decreased by the same amount. The recording is therefore represented by the change (or "delta") over a very small increment of time, either '1' for an increase or '–1' for a decrease. Hence, the encoding scheme is known as "delta modulation." The result is a close but imperfect approximation of the original sound wave, illustrated on the upper graph by 'x' with a caret above it. The fidelity of the reconstructed sound wave to the original will depend in large part on the "sample rate"—the length of the time interval represented by each discrete value in the digital signal. Representing all of the nuances of the original sound wave in order to produce a rich, clear recording may require tens or hundreds of thousands of samples per second.

Appendix A

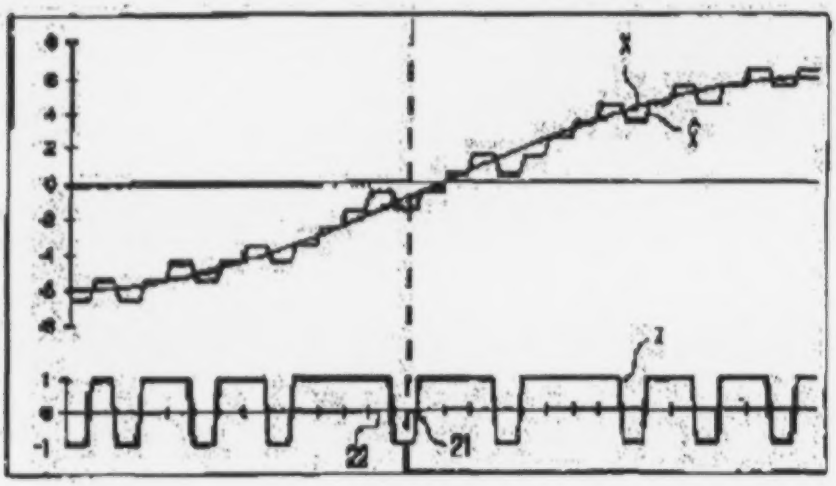
The above-illustrated signal has no watermark. Nuijten's application next illustrates in Figure 3 what occurs when the signal is modified to add a watermark:



The watermark Nuijten posits here is imposed on the signal by altering, if necessary, every hundredth value of the digital signal. A reader seeking to extract the watermark from the digital signal would therefore view only every hundredth value, disregarding the other 99 along the way; by stringing together all such values, the watermarked data may be discerned. Every point where a portion of the watermark is found represents a possibility that the signal may be distorted. If the watermark value designated for a certain position and the original value at that same position happen to coincide, there is no need to modify the original and hence no distortion. About half of the time, though, those values will not coincide and the digital signal will be

altered. The result is shown in the diagram: the digital value at the point labeled '21' and illustrated by a vertical dashed line has been changed from '1' in the original to '–1.' The reconstructed signal is thus decreased where it should be increased, and the encoded signal departs from the original in a pronounced manner.

Nuijten's application teaches that this departure may be minimized by making an additional change to the watermarked digital signal, as shown in Figure 4:



Here, the value preceding the one that was modified by the watermark has also been modified: it was '–1' in the original signal, but is now '1.' The signal is therefore increased, then decreased (where in the original it was decreased, then increased). The resulting encoding has the same watermark as the above example, but as the diagram indicates, it tracks the original sound wave

much more accurately. There is still some small loss in encoding quality relative to the unwatermarked original, but the magnitude of that loss has been greatly decreased.

The above-described procedure is most naturally expressed as a series of steps for adding a low-distortion watermark to a signal, and indeed Nuijten has already obtained allowance of ten claims (Claims 1-10) directed to such a process. Claim 1 is the broadest process claim allowed. It reads:

> A method of embedding supplemental data in a signal, comprising the steps of:
>
> encoding the signal in accordance with an encoding process which includes the step of feeding back the encoded signal to control the encoding; and modifying selected samples of the encoded signal to represent the supplemental data prior to the feedback of the encoded signal and including the modifying of at least one further sample of the encoded signal preceding the selected sample if the further sample modification is found to improve the quality of the encoding process.

Nuijten's Claims 11-13, also allowed by the PTO, are directed to "[a]n arrangement for embedding supplemental data in a signal," including "encoder means for encoding the signal" and other structural features that carry out the above process. Finally,

Appendix A

Nuijten's allowed Claim 15 is directed to "[a] storage medium having stored thereon a signal with embedded supplemental data," where the stored signal has essentially the encoding properties described above. Thus, Nuijten has been allowed claims to the process he invented, a device that performs that process, and a storage medium holding the resulting signals. None of these claims is before us on appeal.

B. *The Claims on Appeal*

The claims whose disallowance Nuijten appeals are not traditional step-by-step process claims, nor are they directed to any apparatus for generating, receiving, processing, or storing the signals. As mentioned above, such claims have been allowed. The claims on appeal seek to cover the resulting encoded signals *themselves.* Claim 14 of Nuijten's application is the only independent claim of the four rejected by the PTO. It reads:

> *A signal* with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.

(emphasis added). Claims 22, 23, and 24 depend on Claim 14, respectively adding requirements that the embedded data be a watermark, that the signal be a video signal, and that the signal be an audio signal.

Appendix A

C. *Procedural History*

The Examiner rejected a number of claims in Nuijten's application for obviousness-type double patenting, and rejected Claims 14, 15, and 22-24 as directed to nonstatutory subject matter under § 101. On appeal, the Board reversed the double-patenting rejections. As to Claim 15, it found that "[t]he storage medium in claim 15 nominally puts the claim into the statutory category of a 'manufacture' " and thus reversed the Examiner's § 101 rejection of that claim. However, it affirmed the Examiner's § 101 rejections of Claims 14 and 22-24 on two grounds. First, it noted that "[t]he signal . . . has no physical attributes and merely describes the abstract characteristics of the signal and, thus, it is considered an 'abstract idea' " unpatentable under *Diamond v. Diehr*, 450 U.S. 175, 185, 101 S.Ct. 1048, 67 L.Ed.2d 155 (1981). Second, the Board determined that the claims at issue fell into none of the four statutory categories of patentable subject matter: "process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. In the Board's view, the claims were not directed to a process because they did not "recite acts"; not a machine because "the signal . . . has no concrete tangible physical structure"; and "not composed of matter and [therefore] clearly not a 'composition of matter.' " Finally, the Board noted that "[t]he signal does not have any physical structure or substance and does not fit the definition of a 'manufacture' which requires a tangible object." Accordingly, the Board rejected Claims 14 and 22-24 solely on the basis of unpatentability under § 101.

Nuijten timely appealed the Board's decision to this court, which has jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

II. DISCUSSION

Whether a claim is valid in light of § 101 is a question of law that we review *de novo*. *AT & T Corp. v. Excel Commc'ns, Inc.*, 172 F.3d 1352, 1355 (Fed.Cir.1999). Section 101 states:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Language setting forth a variety of categories of matter deemed patentable has existed throughout the history of American patent law. The country's first patent statute permitted a patent on "any art, manufacture, engine, machine or device." Patent Act of 1790 § 4, 1 Stat. 109, 111 (1790). Soon thereafter, Congress amended the patent laws, changing the language to allow a patent for "any new and useful art, machine, manufacture or composition of matter." Patent Act of 1793 § 1, 1 Stat. 318, 319 (1793).[2] The next substantial

2. "This bill was probably one written by Thomas Jefferson himself." P.J. Federico, *The Patent Act of 1793*, 18 J. Pat. Off. Soc'y, Feb. 1936, at 77.

amendment to the patent laws left this statutory language unchanged. Patent Act of 1836 § 6, 5 Stat. 117, 119 (1836). This four-category language has persisted to the present day, with the exception of the technical change of "art" to "process," defined as "process, art or method," in 1952. 35 U.S.C. § 100; *see* Part II.B.1, *infra.*

The claims on appeal cover transitory electrical and electromagnetic signals propagating through some medium, such as wires, air, or a vacuum. Those types of signals are not encompassed by any of the four enumerated statutory categories: "process, machine, manufacture, or composition of matter." Before addressing in detail our rationale for this rejection, though, we begin by resolving a dispute between Nuijten and the PTO about the claims' scope.

A. *Claim Construction*

As in any other context in which the scope and meaning of the claims bears on the ultimate determination at hand, we must start by considering the issue of claim construction. *See State St. Bank & Trust Co. v. Signature Fin. Group,* 149 F.3d 1368, 1370 (Fed.Cir.1998) (stating that "whether the . . . patent is invalid for failure to claim statutory subject matter under § 101[ ] is a matter of both claim construction and statutory construction"). Claim construction is a question of law reviewed *de novo* on appeal. *In re Baker Hughes, Inc.,* 215 F.3d 1297, 1301 (Fed.Cir.2000); *Cybor Corp. v. FAS Techs., Inc.,* 138 F.3d 1448, 1451 (Fed.Cir.1998) (*en banc*).

Appendix A

The claim construction dispute between Nuijten and the PTO turns on a somewhat esoteric and metaphysical point, namely: are the claims at issue limited to covering only physical instances of signals, or do they also cover intangible, immaterial strings of abstract numbers? The PTO suggests that "claim 14 can be read to claim a signal that is merely data"—that is, merely numerical information without any physical embodiment. Nuijten disagrees, arguing that "a signal must have sufficient physical substance to be discerned and recognized by a recipient." That is, a signal can be sensed and received by some physical apparatus, if not directly by a person.

Nuijten's position on this issue is correct in a limited way. A "signal" implies signaling—that is, the conveyance of information. To convey information to a recipient a physical carrier, such as an electromagnetic wave, is needed. Thus, in order to be a "signal," as required by the claim, some carrier upon which the information is embedded is required. *See Arrhythmia Research Tech., Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1059 (Fed.Cir.1992) ("The view that there is nothing necessarily physical about 'signals' is incorrect." (quotation marks omitted)).

However, while the claims are limited so as to require *some* physical carrier of information, they do not in any way specify *what* carrier element is to be used. The only limitations in Claim 14 address the signal's informational content. Specifically, the signal must encode some supplemental data, it must have been encoded according to a "given encoding process," and a sample, or single

data point, located before the location of the supplemental data must be different from the original. The text of the claims is not limited by any specified physical medium, nor do the dependent claims add any physical limitations. They again require only that the signal carry certain information-a watermark, video, or audio. Therefore, *any* tangible means of information carriage will suffice for all of the claims at issue. Nuijten's claims can of course be embodied by conventional, known means, such as electrical signals, modulated electromagnetic waves, and pulses in fiber optic cable. So long as some object or transmission carries the information specified by Nuijten's claim, it falls within that claim's scope regardless of its physical form. In summary, some physical form for the signal is required, but any form will do, so long as a recipient can understand the message—the nature of the signal's physical carrier is totally irrelevant to the claims at issue.

B. *The Appealed Claims are Not in Any Statutory Category*

Nuijten and the PTO agree that the claims include physical but transitory forms of signal transmission such as radio broadcasts, electrical signals through a wire, and light pulses through a fiber-optic cable, so long as those transmissions convey information encoded in the manner disclosed and claimed by Nuijten. We hold that such transitory embodiments are not directed to statutory subject matter.

Our inquiry here, like that of the Board, will consider whether a transitory, propagating signal is within any of the four statutory categories: process, machine, manufacture, or composition of matter. Before embarking on an analysis considering each of the four categories, we must address a prior statement of this court which Nuijten argues forecloses such an analysis. In *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1375 (Fed.Cir.1998), we noted that "[t]he question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to—process, machine, manufacture, or composition of matter—but rather on the essential characteristics of the subject matter, in particular, its practical utility." However, we do not consider this statement as a holding that the four statutory categories are rendered irrelevant, non-limiting, or subsumed into an overarching question about patentable utility. Indeed, *State Street* recognized that "the [claimed] subject matter must fall into at least one category of statutory subject matter," *id.* at 1375 n. 9, and specifically found that the claim at issue was directed to a machine, *id.* at 1375. In telling courts where they "should not focus" their analysis, *State Street* was advising not to be concerned about debates over "*which* of the four categories," *id.* (emphasis added), subject matter falls into-that is, not to be overly concerned with pigeonholing subject matter once the court assures itself that *some* category has been satisfied. If, for instance, a court determines that a claim encompasses either a process or machine but is unsure which category

is appropriate, it need not resolve the ambiguity. The claim must be within at least one category, so the court can proceed to other aspects of the § 101 analysis.[3] *See State Street*, 149 F.3d at 1371 ("[I]t is of little relevance whether claim 1 is directed to a 'machine' or a 'process.' "). *State Street* sets forth a sound premise, but this case presents a different situation. The essence of the dispute between the parties is whether a transitory signal is covered by *any* statutory category. The four categories together describe the exclusive reach of patentable subject matter. If a claim covers material not found in any of the four statutory categories, that claim falls outside the plainly expressed scope of § 101 even if the subject matter is otherwise new and useful. We must therefore determine whether any of the four categories encompass the claims on appeal, and it is appropriate to consider each of the categories in turn.

1. Process

Nuijten suggests that a signal of the type covered by the claims is a "process" under that term's statutory meaning, arguing both that a process need not be defined by reference to an act or series of steps, and that his signal claims do refer to the performance of acts.

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3. Of course, a claim that is so unclear as to be ambiguous about whether it covers a process or a machine might be invalid for failure to "particularly point[ ] out and distinctly claim[ ] the subject matter which the applicant regards as his invention," 35 U.S.C. § 112 ¶ 2, but claim definiteness is a requirement separate from patentability under § 101.

Nuijten first notes that "process" is defined as "process, art or method," 35 U.S.C. § 100, and suggests that an "art" is somehow broader than the usual understanding of "process," transcending any requirement of steps or action. The presence of "art" in the statutory definition and its meaning can best be understood by reference to the legislative history of the Patent Act of 1952. The report of the Senate Committee on the Judiciary notes:

> The present law [i.e., the pre-1952 patent statute] states that any person who has invented or discovered any "new and useful art, machine, manufacture, or any new or useful improvement thereof" may obtain a patent. That language has been preserved except that the word "art" which appears in the present statute has been changed to the word "process." "Art" in this place in the present statute has a different meaning than the words "useful art" in the Constitution, and a different meaning than the use of the word "art" in other places in the statutes, and it is interpreted by the courts to be practically synonymous with process or method. The word "process" has been used to avoid the necessity of explanation that the word "art" as used in this place means "process or method," and that it does not mean the same thing as the word "art" in other places.
>
> The definition of "process" has been added in section 100 to make it clear that "process or

> method" is meant, and also to clarify the present law as to the patentability of certain types of processes or methods as to which some insubstantial doubts have been expressed.

S.Rep. No. 82-1979, at 5 (1952), U.S.Code Cong. & Admin.News 1952, pp. 2394, 2398-99. The Supreme Court and this court have consistently interpreted the statutory term "process" to require action. *See Gottschalk v. Benson*, 409 U.S. 63, 70, 93 S.Ct. 253, 34 L.Ed.2d 273 (1972) ("A process is a mode of treatment of certain materials to produce a given result. It is an *act*, or a *series of acts*, performed upon the subject-matter to be transformed and reduced to a different state or thing." (emphasis added) (quoting *Cochrane v. Deener*, 94 U.S. 780, 788, 24 L.Ed. 139 (1876))); *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1316 (Fed.Cir.2005) ("A process is a series of acts." (quoting *Minton v. Nat'l Ass'n of Sec. Dealers, Inc.*, 336 F.3d 1373, 1378 (Fed.Cir.2003))); *In re Kollar*, 286 F.3d 1326, 1332 (Fed.Cir.2002) ("[A] process . . . consists of a series of acts or steps. . . . It consists of doing something, and therefore has to be carried out or performed."). Nuijten's argument that his claims might be covered by the "process" category even if they do not recite acts therefore lacks merit.

Nuijten also notes that his signal claims recite acts, noting that the claimed signal must be "encoded in accordance with a given encoding process." But all that recitation implies is that these are potentially product-

by-process claims "in which the product is defined at least in part in terms of the method or process by which it is made." *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1315 (Fed.Cir.2006) (quoting *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 158, 109 S.Ct. 971, 103 L.Ed.2d 118 (1989)). Such claims are still directed to the ultimate product, not the underlying process. *See Id.* at 1317 ("Regardless of how broadly or narrowly one construes a product-by-process claim, it is clear that such claims are always to a product, not a process."). The presence of acts recited in the claim does not transform a claim covering a thing—the signal itself—into one covering the process by which that thing was made.

Since a process claim must cover an act or series of acts and Nuijten's signal claims do not, the claims are not directed to a process.

2. Machine

The Supreme Court has defined the term "machine" as "a concrete thing, consisting of parts, or of certain devices and combination of devices." *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 570, 17 L.Ed. 650 (1863). This "includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." *Corning v. Burden*, 56 U.S. 252, 267, 15 How. 252, 14 L.Ed. 683 (1853). A transitory signal made of electrical or electromagnetic variances is not made of "parts" or "devices" in any mechanical sense. While such a signal

is physical and real, it does not possess concrete structure in the sense implied by these definitions. No part of the signal—the crests or troughs of the electromagnetic wave, or perhaps the particles that make it up (modern physics teaches that both features are present simultaneously) is a mechanical "device" or "part." A propagating electromagnetic signal is not a "machine" as that term is used in § 101.[4]

3. Manufacture

The question of whether the claimed signals are "manufactures" is more difficult. They are man-made, in the sense of having been encoded, generated, and transmitted by artificial means. However, artificiality is insufficient by itself to render something a "manufacture." The Supreme Court has defined "manufacture" (in its verb form) as "the production of *articles* for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." *Diamond v. Chakrabarty*, 447 U.S. 303, 308, 100 S.Ct. 2204, 65 L.Ed.2d 144 (1980) (emphasis added) (quoting *Am. Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11, 51 S.Ct. 328, 75 L.Ed. 801 (1931)).[5] The term is used in

4. An apparatus that *generates* the signal is of course a machine. Nuijten has obtained allowance of claims covering such a device, and those claims are not before us on appeal.

5. The dissent criticizes our use of this definition and would prefer one from "a dictionary that dates to the eighteenth (Cont'd)

the statute in its noun form, *Bayer AG v. Housey Pharms., Inc.*, 340 F.3d 1367, 1373 (Fed.Cir.2003), and therefore refers to "articles" resulting from the process of manufacture. The same dictionary the Supreme Court relied on for its definition of "manufacture" in turn defines "article" as "a particular substance or commodity: as, an *article* of merchandise; an *article* of clothing; salt is a necessary *article*." 1 Century Dictionary 326 (William Dwight Whitney ed., 1895) (emphasis in original).

These definitions address "articles" of "manufacture" as being tangible articles or commodities. A transient electric or electromagnetic transmission does not fit within that definition. While such a transmission is man-made and physical—it exists in the real world and has tangible causes and effects—it is a

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century." Dissent at 1361. However, this statutory language was re-enacted in 1952 after the Supreme Court defined "manufacture" in *American Fruit Growers*. By reenacting the language used in previous versions of the statute without change to the meaning of the word "manufacture," Congress "incorporated the definition of [manufacture] that had evolved in the courts." *In re Schrader*, 22 F.3d at 295. Even were this not the case, the Court has reaffirmed the *American Fruit Growers* definition in *Chakrabarty*. Thus, we must apply the *Fruit Growers/Chakrabarty* definition. *Indep. Ink, Inc. v. Ill. Tool Works, Inc.*, 396 F.3d 1342, 1351 (Fed.Cir.2005), *vacated* 547 U.S. 28, 126 S.Ct. 1281, 164 L.Ed.2d 26 (2006) ("It is the duty of a court of appeals to follow the precedents of the Supreme Court until the Court itself chooses to expressly overrule them.").

change in electric potential that, to be perceived, must be measured at a certain point in space and time by equipment capable of detecting and interpreting the signal. In essence, energy embodying the claimed signal is fleeting and is devoid of any semblance of permanence during transmission.[6] Moreover, any tangibility arguably attributed to a signal is embodied in the principle that it is perceptible—e.g., changes in electrical potential can be measured. All signals within the scope of the claim do not themselves comprise some tangible article or commodity.[7] This is particularly true when the signal is

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6. Of course, such a signal could be stored for later use, but the result of such storage would be a "storage medium" containing the signal. Such a storage medium would likely be covered by allowed Claim 15 of Nuijten's application, which is not before us on appeal.

7. The dissent perpetuates a common mischaracterization of the holding in *Alappat*, 33 F.3d at 1544 by suggesting that we have conflated the "result" of the "useful, concrete, and tangible result" inquiry with a "thing" that must be useful, concrete and tangible. The dissent is wrong. In *Alappat*, we decided the question of determining whether a machine, including a number of digital electronic circuits that performed mathematical operations on electrical signals (a function we deemed "true of all digital electrical circuits") was an "abstract idea" because the function performed by the machine was, in essence, a mathematical algorithm. *Alappat*, 33 F.3d at 1544. We concluded that the combination of digital electronic circuits was "not a disembodied mathematical concept which may be characterized as an 'abstract idea,' but rather a *specific machine* to produce a useful, concrete, and tangible result." *Id.* (emphasis added). We reiterated these principles in finding that the

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encoded on an electromagnetic carrier and transmitted through a vacuum—a medium that, by definition, is devoid of matter.[8] Thus, we hold that Nuijten's signals, standing alone, are not "manufacture[s]" under the meaning of that term in § 101.[9]

(Cont'd)
machine claimed in State Street was not an abstract idea. *See State Street,* 149 F.3d at 1368. We have even considered the "useful, concrete, and tangible result" factors in determining whether a claim to a process was patent-eligible. *See AT & T Corp. v. Excel Commc'ns,* 172 F.3d 1352, 1358 (Fed.Cir.1999). The dissent agrees that the claimed signal is not a "machine." We have never held that a *manufacture* is ever required to produce any result. Thus, the "useful, concrete, and tangible result" inquiry is simply inapplicable here.

8. We recognize the wave-particle duality as applied to electromagnetic energy. However, the fact that photons traveling at or near the speed of light behave in some ways like particles does not make them tangible articles.

9. Neither *In re Hruby,* 54 C.C.P.A. 1196, 373 F.2d 997 (1967), nor *O'Reilly v. Morse,* 56 U.S. (15 How.) 62, 14 L.Ed. 601 (1853) is to the contrary. *Hruby* dealt with a 35 U.S.C. § 171 design patent for an aesthetically pleasing water fountain rather than a § 101 utility patent, and is therefore of limited applicability to this case. The subject of a design patent need not have any practical utility. *Compare* § 101 ("new and useful") *with* § 171 ("new . . . and ornamental"). We do not decide whether a signal of the sort addressed in this case would merit a design patent. In the *Morse* telegraph case, the Supreme Court approved Samuel Morse's Claim 5 covering his "system of signs" (i.e., Morse code). 56 U.S. (15 How.) at 86. The written description of
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4. Composition of matter

As to the final statutory category, Nuijten does not challenge in his opening brief the Board's conclusion that "[t]he signal is not composed of matter and is clearly not a 'composition of matter.' " We note, however, that the Supreme Court has defined "composition of matter" to mean "all compositions of two or more substances and all composite articles, whether they be the results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids." *Chakrabarty*, 447 U.S. at 308, 100 S.Ct. 2204. A signal comprising a fluctuation in electric potential or in electromagnetic fields is not a "chemical union," nor a gas, fluid, powder, or solid. Nuijten's signals are not "composition[s] of matter."

III. CONCLUSION

A transitory, propagating signal like Nuijten's is not a "process, machine, manufacture, or composition of matter." Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C.

(Cont'd)

the patent describes Morse code as part of its description of the actual process of signaling. *Id.* at 94-95. While its dated language obscures the question somewhat, Morse's Claim 5 is a process claim covering the method (or "art") of signaling. The analogous claims in Nuijten's patent application are those that cover the process of generating signals rather than the signals themselves. Again, those claims have been approved by the PTO and are not at issue in this appeal.

§ 101; thus, such a signal cannot be patentable subject matter. The Board's rejection of the application's Claims 14, 22, 23, and 24 is therefore

AFFIRMED.

Each party shall bear its own costs.

Appendix A

LINN, Circuit Judge, concurring-in-part and dissenting-in-part.

I am pleased to join Part II.A of the majority opinion because I agree that a "signal," as used in the claims at issue, refers to something with a "physical form." Majority Op. at 1352-53. However, I respectfully disagree with the majority's holding that the claims in suit are not directed to statutory subject matter under 35 U.S.C. § 101. I therefore dissent in part from Part II.B of the opinion and from the judgment.

This case presents challenging questions that go beyond the single patent claim at issue. In determining the scope of patentable subject matter, we must reconcile cutting-edge technologies with a statute, the language of which dates back to the beginning of the Republic. Moreover, we decide this case against a backdrop of ongoing controversy regarding the wisdom of software patenting and our decision in *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368 (Fed.Cir.1998). I appreciate the majority's desire to draw an exclusionary line. However, mindful of our duty to interpret the law as Congress wrote it rather than attempt "to preempt congressional action by judicially decreeing what accords with 'common sense and the public weal,' " *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 195, 98 S.Ct. 2279, 57 L.Ed.2d 117 (1978), I respectfully disagree that the majority's holding is compelled by or consistent with precedent or the language of the statute. Indeed, I fear that it risks further confusing an already uncertain set of doctrines.

Appendix A

The majority bases its holding on the *Century Dictionary* definition of "manufacture" quoted by the Supreme Court in *American Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11, 51 S.Ct. 328, 75 L.Ed. 801 (1931), and again in *Diamond v. Chakrabarty*, 447 U.S. 303, 308, 100 S.Ct. 2204, 65 L.Ed.2d 144 (1980): "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." I respectfully disagree that this definition limits the term "manufacture" to non-transitory, tangible things. When it defined "manufacture" as above, the Supreme Court emphasized that "[i]n choosing such expansive terms as 'manufacture' . . . modified by the comprehensive 'any,' Congress plainly contemplated that the patent laws would be given wide scope." *Chakrabarty*, 447 U.S. at 308, 100 S.Ct. 2204. Because the patent claim at issue contemplates "some physical carrier of information," Majority Op. at 1353, the claim requires that some input "material"—whether a pulse of energy or a stone tablet—has been given a "new form[ ]," "qualit[y]," or "propert[y]" by direct human action or by a machine. The resulting signal is thus a "manufacture" in the "expansive" sense of § 101. *See also Am. Fruit*, 283 U.S. at 11, 51 S.Ct. 328 (offering as a second definition of "manufacture," "anything made for use from raw or prepared materials").

Because I believe the claimed signal is a manufacture, it is necessary for me also to examine the alternative argument that the claimed signal is an

unpatentable "abstract idea" under *Gottschalk v. Benson*, 409 U.S. 63, 67, 93 S.Ct. 253, 34 L.Ed.2d 273 (1972). The answer to this argument is best found in § 101's textual requirements that statutory subject matter be "new" and "useful," which are limits on the four statutory categories that otherwise encompass "anything under the sun that is made by man." *Chakrabarty*, 447 U.S. at 309, 100 S.Ct. 2204 (quoting S.Rep. No. 1979, 82d Cong., 2d Sess., at 5 (1952), U.S.Code Cong. & Admin. News 1952, at 2398-99; H.R.Rep. No. 1923, 82d Cong., 2d Sess., at 6 (1952)). As I explain in the following analysis, it is my view that the claim at issue is both "new" and "useful" and is not an abstract idea.

Because I conclude that the claim at issue is directed to a "new and useful" "manufacture," I believe it is patentable under 35 U.S.C. § 101. Accordingly, I would reverse.

I. The Definition of "Manufacture"

I agree with the majority that the subject of Nuijten's signal claims is not a "machine," "process," or "composition of matter" as used in 35 U.S.C. § 101. As the majority recognizes, however, "[t]he question of whether the claimed signals are 'manufactures' is more difficult." Majority Op. at 1356. As mentioned, the Supreme Court quoted in *American Fruit* the following definition of "manufacture," upon which the majority relies today: "the production of articles for use from raw or prepared materials by giving to these materials new

forms, qualities, properties, or combinations, whether by hand-labor or by machinery." 283 U.S. at 11, 51 S.Ct. 328 (quoting 5 *Century Dictionary* 3620 (William Dwight Whitney ed., 1895)), *quoted in Diamond v. Chakrabarty*, 447 U.S. 303, 308, 100 S.Ct. 2204, 65 L.Ed.2d 144 (1980). Based on this definition and the associated definition of "article," the majority concludes that manufactures must be "tangible," a definition that excludes "[a] transient electric or electromagnetic transmission." Majority Op. at 1356. With all due respect, I believe that these conclusions are erroneous.

First, the majority's holding is unsupported by the authority it cites. Even if accepted as controlling, *see infra* at 1360-61, the *American Fruit* definition of "manufacture" is not limited to tangible or non-transitory inventions by its own terms, nor does the claimed signal fail to be "material" in the relevant sense. The raw "materials" that take new form to become "manufactures" need not be tangible or permanent inputs: the Century Dictionary defines "material" to mean, inter alia, "that which composes or makes a part of anything."[1] "Material" II.2, 5 *Century Dictionary* 3657.

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1. Our statement that an invention is patentable subject matter when it "produce[s] a useful, concrete, and tangible *result*," see *In re Alappat*, 33 F.3d 1526, 1544 (Fed.Cir.1994) (en banc) (emphasis added), does not impose a requirement that a patentable manufacture must be a tangible *thing*. Rather, the fact that an invention gives rise to some tangible result is one indication that it is not an unpatentable abstract idea. *Id.*; *see also infra* at 1365.

The majority's definition for "article"—"a particular substance or commodity"—likewise provides no indication that the substance must last any longer than is necessary to be useful. *See* Majority Op. at 1356. Moreover, an article does not cease to be an article when it "must be measured . . . by equipment capable of detecting and interpreting" it. *Id.* Myriad inventions, particularly in the chemical arts, can only be detected using equipment—this is inevitable if patents are to cover advanced technologies. Indeed, we have squarely held that transitory inventions are patentable under § 101. For example, in *In re Breslow,* we held that chemical intermediates are patentable compositions of matter under § 101 even if they are "transitory, unstable, and non-isolatable." 616 F.2d 516, 519, 521-22 (C.C.P.A.1980). In so holding, we recognized that the compounds "can as well be considered 'manufactures' as 'composition[s] of matter' ". *Id.* at 522; *see also Zenith Labs. v. Bristol-Myers Squibb Co.,* 19 F.3d 1418, 1422 (Fed.Cir.1994) (noting that infringement may occur where a pharmaceutical is converted into a claimed chemical compound *in vivo*).

In any event, it is doubtful that looking to a definition of "article" is necessary. The *American Fruit* Court quoted a second definition for "manufacture" from the Century Dictionary in addition to the one repeated in *Chakrabarty*: "anything made for use from raw or prepared materials." 283 U.S. at 11, 51 S.Ct. 328. This definition does not, by its terms, require that a "manufacture" be an "article" or a transformed "raw material," only that it be something—"anything"—made from them.

Second, the majority simply assumes, without reference to its own construction of the claim, that Nuijten's signal is "fleeting." Majority Op. at 1356. The claim refers to multiple "samples," one "preceding" the next, in a specified relationship. In conjunction with the specification's references to "prediction" of a watermark bit's effect on subsequent bits of the input signal and the invention's preferred use for audio or video signals, it is apparent that the claimed signal must extend over some interval of time. In *In re Hruby*, 54 C.C.P.A. 1196, 373 F.2d 997 (1967), we held that it was not the dynamic position of any given water droplet, but rather the overall pattern, that was patentable; likewise, here, it is the overall signal, not the physical manifestation of a single bit, that constitutes the invention. Just as the design of a fountain lasts so long as the water is flowing, the signal lasts so long as the transmission of the signal is in progress. In many embodiments—for example, when the signal encodes an audio or video signal representing a symphony or a full-length motion picture that is being watched in real time—the transmission may be in progress for a significant period of time. And as the majority holds, the claim makes no assumptions about what physical form the signal might take. The claim therefore encompasses embodiments, such as inscriptions on paper, in which the signal itself may last indefinitely.

Third, neither *American Fruit Growers* nor *Chakrabarty* confronted or decided a question of tangibility or permanence. The question in *American Fruit Growers* was whether "an orange, the rind of which

has become impregnated with borax, through immersion in a solution, and thereby rendered resistant to blue mold decay," was a "manufacture" within the meaning of the predecessor to § 101. 283 U.S. at 11, 51 S.Ct. 328. The court answered the question in the negative, not because an orange is not "tangible," but because treated citrus fruits do not "possess[ ] a new or distinctive form, quality, or property," and thus are not made by man. *Id.* Likewise, in *Chakrabarty,* the Court held that a genetically-engineered bacterium was patentable because it was "a nonnaturally occurring manufacture or composition of matter—a product of human ingenuity having a distinctive name, character [and] use." 447 U.S. at 309-10, 100 S.Ct. 2204 (quotation marks omitted) (alteration in original). Indeed, as I will discuss below, the *Chakrabarty* Court cited the *American Fruit* definition of "manufacture" only in support of the proposition that the term was "expansive" and that "Congress plainly contemplated that the patent laws would be given wide scope." *Id.* at 308, 100 S.Ct. 2204. In neither case did the Court decide or discuss the question that is before us today.

Fourth, the language we are called to interpret is venerable. As the majority recognizes, with the exception of the substitution of "process" for "art," the four categories of statutory subject matter in § 101 have remained unchanged since the 1793 Patent Act. Act of Feb. 21, 1793, ch. 11, § 1, 1 Stat. 318. "Manufacture" was a statutory category even in the very first United States Patent Act of 1790. Act of Apr. 10, 1790, ch. 7, § 1, 1 Stat. 109. Indeed, "manufactures" were the

subject of the British Statute of Monopolies of 1623, 21 Jac. 1, ch. 3. *See generally Ex parte Lundgren*, No.2003-2088, 2004 WL 3561262, *13-20, 2005 Pat.App. LEXIS 34, at *32-*50 (B.P.A.I. April 20, 2004) (Barrett, A.P.J., concurring-in-part and dissenting-in-part) (discussing history of statutory subject matter).

In part because of this, I question whether this case can be decided by reference to a dictionary definition of "manufacture." *See Alappat*, 33 F.3d at 1553 (Archer, C.J., concurring-in-part and dissenting-in-part) ("These terms may not be read in a strict literal sense entirely divorced from the context of the patent law."). To the extent such a definition might be helpful, however, it should be one that is contemporary with the statutory language, and thus a dictionary that dates to the eighteenth century. *See, e.g., St. Francis Coll. v. Al-Khazraji*, 481 U.S. 604, 610-12, 107 S.Ct. 2022, 95 L.Ed.2d 582 (1987) (using mid-nineteenth-century dictionaries to construe 1866 Civil Rights Act).

One example of a contemporary dictionary is Samuel Johnson, *A Dictionary of the English Language* (3d ed. 1768), *available at* http:// books. google. com? id= bXsCAAAAQAAJ, which defines manufacture as "[a]ny thing made by art."[2] "Art," in turn, is defined as "[t]he

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2. The majority criticizes my use of an alternative dictionary definition to the one the Supreme Court enunciated in *Chakrabarty*. Majority Op. at 1356 n. 5. However, the alternative definition is in no way inconsistent with the *Chakrabarty* one, nor with the second definition of (Cont'd)

power of doing something not taught by nature and instinct"; "[a] science"; "[a] trade"; "[a]rtfulness, skill, dexterity." *Id.* This connection is significant because of the parallel use of "art" and "manufacture" in the 1790 and 1793 Patent Acts and because of the use of the term "useful Arts" in the Patent Clause of the Constitution.[3]

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"manufacture" that the Supreme Court provided in *American Fruit*, which like *Chakrabarty* remains good law. Under such circumstances, we do not breach our duty to follow Supreme Court precedent by looking to additional sources to further inform our understanding of the statutory language.

3. The majority cites the legislative history of the 1952 Patent Act for the proposition that "art" is not "broader than the usual understanding of 'process.' " Majority Op. at 1354-55. The drafters of the 1952 patent act changed "art" to "process" in § 101 in recognition of the fact that "art" in § 101 had been interpreted by the courts to apply to process and method claims. However, the inclusion of "art" in the new § 100(b) definition of "process" is a strong suggestion that Congress intended the change in language to be clarifying rather than narrowing. Regardless, this change certainly did not narrow the scope of "manufacture."

Even if the 1952 Senate Committee on the Judiciary was correct that "art," as used in the pre-1952 patent statutes, "has a different meaning than the words 'useful art' in the Constitution," S.Rep. No. 82-1979, at 5 (1952), U.S.Code Cong. & Admin.News 1952, at pp. 1298-99, and applies only to what we now describe as process claims, I believe that the four categories of statutory subject matter have consistently been intended to complement one another and to protect the full scope of technological ingenuity—the "useful Arts."

U.S. Const., art. I, cl. 8; *see also In re Comiskey,* 499 F.3d 1365, 1375 (Fed.Cir.2007) ("The Constitution explicitly limited patentability to 'the national purpose of advancing the useful arts—the process today called technological innovation.' ") (quoting *Paulik v. Rizkalla,* 760 F.2d 1270, 1276 (Fed.Cir.1985) (en banc)); Karl B. Lutz, *Patents and Science: A Clarification of the Patent Clause of the U.S. Constitution,* 18 Geo. Wash. L.Rev. 50, 54 (1949) ("The term 'useful arts,' as used in the Constitution . . . is best represented in modern language by the word 'technology.' ").

Thus, it appears that rather than delineate specific, narrow categories, Congress has consistently intended statutory subject matter to cover the full scope of technological ingenuity, however it might best be claimed. Thus, "art" and "process[es]" might be viewed, in rough terms, as the exercise of technological skill, "manufacture[s]" and "composition[s] of matter" as the products of that skill, and "machine[s]" as the tools through which that skill is exercised. *See Comiskey,* 499 F.3d at 1377 (observing that a method claim involving a mental process or algorithm qualifies as a "process" under § 101 when it "(1) is tied to a machine or (2) creates or involves a composition of matter or manufacture").

We and the Supreme Court have each recognized and applied this broad approach, frequently declining to decide in which statutory category a claim belongs. *See, e.g., Chakrabarty,* 447 U.S. at 307-08, 100 S.Ct. 2204 (deciding the patentability of a claimed microorganism

without determining whether it was a "manufacture" or "composition of matter"); *Gottschalk v. Benson*, 409 U.S. at 67-68, 93 S.Ct. 253 (quoting a principle of patentability from *Funk Bros. Seed Co. v. Kalo Co.*, 333 U.S. 127, 68 S.Ct. 440, 92 L.Ed. 588 (1948), and stating, "We dealt there with a 'product' claim, while the present case deals with a 'process' claim. But we think the same principle applies."); *State Street Bank*, 149 F.3d at 1375 ("The question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to . . . but rather on the essential characteristics of the subject matter . . . ." (emphasis omitted)).

Of course, as we noted in *State Street Bank*, a claim must be drafted to at least one of the four categories. 149 F.3d at 1375 n. 9. As the allowed and disallowed claims in this case demonstrate, however, claims to essentially the same invention can frequently be drafted, with at most subtle differences in scope, to either processes or manufactures.. Patentability does not depend on which form the claim takes. *Cf. Parker v. Flook*, 437 U.S. 584, 588-90, 593, 98 S.Ct. 2522, 57 L.Ed.2d 451 (1978) (holding that where the "only novel feature" of an "otherwise conventional" method is an unpatentable algorithm, the mere addition of the conventional method steps to an unpatentable claim does not confer patentability, because to do otherwise "would make the determination of patentable subject matter depend simply on the draftman's art").

Fifth, and finally, I believe the majority does not follow the guidance that the Supreme Court provided in *Chakrabarty* as to how we should interpret § 101. As the Court observed, "Congress plainly contemplated that the patent laws would be given wide scope." 447 U.S. at 308, 100 S.Ct. 2204. Accordingly, *Chakrabarty* embraces the notion that the scope of patentable subject matter includes "anything under the sun that is made by man." *Id.* at 309 100 S.Ct. 2204 (quoting S.Rep. No. 82-1979, at 5 (1952), U.S.Code Cong. & Admin.News 1952, At 2398-99; H.R.Rep. No. 82-1923, at 6 (1952)). Granted, *Chakrabarty* also cautions that there are exceptions to these sweeping pronouncements: "This is not to suggest that § 101 has no limits or that it embraces every discovery. The laws of nature, physical phenomena, and abstract ideas have been held not patentable." *Id.* But altogether, the most straightforward interpretation of the Supreme Court's guidance in *Chakrabarty* is that an invention qualifies as patentable subject matter if it (1) is "made by man," and (2) does not involve an attempt to patent "laws of nature, physical phenomena, [or] abstract ideas." Indeed, this is the analysis the *Chakrabarty* Court appears to follow: "Judged in this light, respondent's micro-organism plainly qualifies as patentable subject matter. His claim is not to a hitherto unknown natural phenomenon, but to a nonnaturally occurring manufacture or composition of matter-a product of human ingenuity 'having a distinctive name, character, [and] use.' " *Id.* at 309-10, 100 S.Ct. 2204; *see also AT & T Corp. v. Excel Commc'ns, Inc.*, 172 F.3d 1352, 1355, 1361 (Fed.Cir.1999) (applying § 101 by subtracting

from "anything under the sun that is made by man" only the three exceptions enumerated by the Supreme Court). The Court's analysis leaves little room for the term "manufacture" to impose additional limitations on the scope of patentable subject matter.

II. "Abstract Ideas" and the Requirements of Section 101

I now turn to the question of whether Nuijten's claimed signal falls within one of the exceptions from patentable subject matter. To best answer this question, I consider the text of the statute. *See Diamond v. Diehr*, 450 U.S. 175, 182, 101 S.Ct. 1048, 67 L.Ed.2d 155 (1981).

35 U.S.C. § 101 provides:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

In addition to the requirement that patentable subject matter fall within one of the four statutory categories ("process, machine, manufacture, or composition of matter"), it must also be "new and useful."[4] As with the

4. An argument can be made that the "new" and "useful" requirements also inhere to some extent in the statutory categories themselves; the first *American Fruit* definition of

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term "manufacture," we must be sensitive to the fact that modern everyday usage may be a poor guide to the meaning of such old and oft-interpreted text. Nonetheless, the terms "new" and "useful" define and delimit the exceptions from statutory subject matter.

A. "New"

"Novelty," as a patent doctrine, is ordinarily regarded as a requirement not of § 101 but of § 102. *See Diehr*, 450 U.S. at 189, 101 S.Ct. 1048 ("It has been urged that novelty is an appropriate consideration under § 101. . . . Section 101, however, is a general statement of the type of subject matter that is eligible for patent protection 'subject to the conditions and requirements of this title.' Specific conditions for patentability follow and § 102 covers in detail the conditions relating to novelty."). Nonetheless, precedent supports attributing to the term "new" in § 101 a separate requirement that statutory subject matter be a type of invention that can be described as a "new" creation rather than the discovery of a pre-existing principle. *See Titanium*

(Cont'd)

"manufacture" refers to "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations." 283 U.S. at 11, 51 S.Ct. 328 (emphases added); *id.* at 12, 51 S.Ct. 328 (rejecting argument that an orange impregnated with borax is a manufacture because it "remains a fresh orange fit only for the same beneficial uses as therefore"). Because the statutory terms "new," "useful," and "manufacture" appear together, this possibility does not alter the analysis.

Metals Corp. of Am. v. Banner, 778 F.2d 775, 780-81 (Fed.Cir.1985) (emphasizing the requirement of § 101 that "what is sought to be patented, as determined by the claims, be new" and observing that "[s]ection 102, the usual basis for rejection for lack of novelty or anticipation, lays down certain principles for determining the novelty required by § 101"); *cf. Diehr,* 450 U.S. at 211, 101 S.Ct. 1048 (Stevens, J., dissenting) (discussing the difference between the so-called "discovery" requirement of § 101 and the "novelty" requirement of § 102). This accords with the language of the legislative history, discussed above, that patentable subject matter comprises "anything under the sun that is *made by man.*" *Chakrabarty,* 447 U.S. at 309 (emphasis added). To be "made by man," something must not be pre-existing in nature; it must be, literally, an invention.

As the Supreme Court observed in *Funk Bros.*, "patents cannot issue for the discovery of the phenomena of nature" because such phenomena "are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none. . . . If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end." 333 U.S. at 130, 68 S.Ct. 440, *quoted in Chakrabarty,* 447 U.S. at 309, 100 S.Ct. 2204. Thus, a discovery or invention can fail to be "new" in the § 101 sense even if it has not previously been known to man or recorded in the prior art—that is, even if it is "novel" under § 102. Certain innovations, no matter how new to human thought, are not the type of technological invention to

which Congress has extended patent protection, but instead are considered to be abstract truths that were not "made by man." "The underlying notion is that a scientific principle . . . reveals a relationship that has always existed." *Flook*, 437 U.S. at 593 n. 15, 98 S.Ct. 2522.

This insight, I believe, is at the core of the judicial doctrine by which laws of nature, natural phenomena, and abstract ideas are excluded from patentable subject matter. For example, in *Gottschalk v. Benson*, the Supreme Court considered a proposed patent claim for a method for converting binary-coded decimal numbers ("BCD") into pure binary numbers. Quoting *Funk Bros.*, the Court distinguished "a hitherto unknown phenomenon of nature" from "the application of the law of nature to a new and useful end," 409 U.S. at 67, 93 S.Ct. 253 (quoting 333 U.S. at 130, 68 S.Ct. 440). Applying this distinction, the Court observed that the "claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion." *Id.* at 68, 93 S.Ct. 253. Thus, the effect of allowing the patent would be to allow "a patent on the algorithm itself," and such a patent was impermissible. *Id.* at 72, 93 S.Ct. 253. Although the Court did not make this connection explicit, I believe that one reason why the method for converting between the binary and binary-coded decimal systems was deemed to be unpatentably abstract was that the claims attempted to monopolize a timeless mathematical relationship among integers, even if the particular representations of the integers may have been new to computer science.

See id. at 67-68, 93 S.Ct. 253. In other words, the algorithm might have been novel under § 102, but—like all purely mathematical algorithms—it was not "new" under § 101.[5]

B. "Useful"

Section 101 also requires that patented subject matter be "useful." Although we have treated the utility requirement of § 101 as a distinct concept from the question of whether an invention qualifies as patentable subject matter, a patent claim directed to a law of nature, a physical phenomenon, or an abstract idea will ordinarily have practical applications that are too attenuated from the subject of the claim to be "useful." We recognized this in *In re Alappat* and *State Street Bank* by requiring that patentable subject matter

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5. A similar observation answers Justice Breyer's apparent criticism of *State Street Bank* in his dissent from dismissal of certiorari in *Laboratory Corp. of America Holdings v. Metabolite Laboratories, Inc.*, __ U.S. __, 126 S.Ct. 2921, 165 L.Ed.2d 399 (2006). Justice Breyer summarized *State Street Bank* as saying that "a process is patentable if it produces a 'useful, concrete, and tangible result,' " but observed that the Supreme Court "has never made such a statement" and cited, as examples of patent claims that would meet that test, but that the Supreme Court invalidated, the claims in *Benson*, *Flook*, and *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 14 L.Ed. 601 (1853) (involving a claim to "the use of electromagnetic current for transmitting messages over long distances") (discussed infra at 1368). 126 S.Ct. at 2928. The *State Street Bank* test—which I will discuss more in Part II.B, infra-speaks only to the "useful" requirement of § 101.

manifest a "useful, concrete, and tangible result," but the principle is not new to those cases. For example, in *Funk Bros.*, the Supreme Court distinguished an unpatentable "hitherto unknown phenomenon of nature" from a patentable "*application* of the law of nature to a new and *useful* end." 333 U.S. at 130, 68 S.Ct. 440 (emphases added).

Even where a person of ordinary skill in the art might readily conceive of some application of an abstract principle, it is the application rather than the principle itself that must be patented. In *Benson*, the Supreme Court rejected patent claims to a system for converting binary-coded decimals to pure binary numbers because the claim was "so abstract as to cover both known and unknown uses of the . . . conversion. The end use may (1) vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus." 409 U.S. at 68, 93 S.Ct. 253. Put differently, although mathematical algorithms and similarly abstract principles may be useful (in the casual sense of the term) in a wide variety of contexts, their utility is too far removed from what is claimed for them to be "useful" under § 101. *See Brenner v. Manson*, 383 U.S. 519, 534-35, 86 S.Ct. 1033, 16 L.Ed.2d 69 (1966) (requiring that the "specific benefits" to be conferred by a claimed invention "exist[ ] in [the invention's] currently available form"); *see also In re Fisher*, 421 F.3d 1365, 1371 (Fed.Cir.2005) (requiring that a claimed invention have "specific and substantial utility to satisfy § 101," and

rejecting a claim to a gene sequence where the sequence has only been shown to have "biological activity").

A similar concept of whether the utility of claimed subject matter is too attenuated from what is actually claimed undergirds the "printed matter" doctrine. At oral argument, the PTO invoked printed matter cases in the context of why Nuijten's claim 15, to "a storage medium having stored thereon" a signal, was allowable even though (according to the PTO) claim 14, to the signal *simpliciter*, was not. Oral Arg. at 00:44:41-00:45:18, *available at* http:// www. cafc.uscourts.gov/oralarguments/mp3/06-1371.mp3 (citing In re *Lowry*, 32 F.3d 1579 (Fed.Cir.1994), and *In re Beauregard*, 53 F.3d 1583 (Fed.Cir.1995) (order)). Under the "printed matter" doctrine, if the only distinction between a prior art storage medium and a claimed storage medium is the information stored thereon—rather than a different "functional relationship between the printed matter and the substrate"—then the claimed storage medium (with associated information) is unpatentably obvious over the prior art because the information lacks "patentable weight." *In re Gulack*, 703 F.2d 1381, 1387 (Fed.Cir.1983). The "printed matter" rejection has been treated as a doctrine under § 103 rather than § 101, but it seems potentially more apposite as a consequence of the "useful" requirement of § 101. The Supreme Court has applied similar reasoning in § 101 cases. *See, e.g., Flook*, 437 U.S. at 592, 98 S.Ct. 2522 ("We think this case must also be considered as if the principle or mathematical formula were well known.").

Appendix A

In *Lowry*, the case upon which the PTO relied principally at oral argument, we considered the allowability of patent claims for a computer memory storage system containing a particular set of data structures that were useful for more quickly storing and retrieving data in a database system. 32 F.3d at 1580-82. We concluded that

> Lowry's data structures impose a physical organization on the data. . . . More than mere abstraction, the data structures are specific electrical or magnetic structural elements in a memory. According to Lowry, the data structures provide tangible benefits: data stored in accordance with the claimed data structures are more easily accessed, stored, and erased [and] represent complex data accurately and enable powerful nested operations. In short, Lowry's data structures are physical entities that provide increased efficiency in computer operation.

Id. at 1583-84. Consequently, we held, the PTO's printed matter rejection was erroneous. From this, the PTO apparently takes the position that functional but intangible software, data structures, signals, and the like are patentable under *Lowry* if they are encoded on a tangible medium, but unpatentable (as failing a tangibility requirement to be "manufactures") if the medium is not referenced in the claims. Absent *Lowry*, the PTO's position apparently would be that Nuijten's claim 14 (the signal, standing alone) is unpatentable

subject matter under § 101, and that claim 15 (the storage medium containing the signal) is unpatentably obvious under § 103 over prior art storage media.[6]

The PTO's position makes little sense. As a doctrinal matter, the PTO should not look to § 101 sometimes and § 103 at other times to accomplish essentially the same end. As a matter of principle, there is little reason to allow patent claims to otherwise unpatentable, deemed abstractions just because those deemed abstractions are stored in a tangible medium, while rejecting the same inventions standing alone. Nuijten's signal involves the same degree and type of human ingenuity whether or not it happens to be encoded in the magnetic fields of a hard disk drive, the optical pits of a compact disc, a stream of photons propagating across a vacuum, or any other specific form that technology might put it in. The signal is either a "new and useful" manufacture or it is not. To allow a patent on a storage medium containing the signal but to deny one to the real underlying invention "make[s] the determination of patentable subject matter depend simply on the draftman's art" in the sense criticized by the Supreme Court in *Flook*, 437

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6. The other case the PTO cited at oral argument, *In re Beauregard*, was not a decision by this court as to the merits of patentability. Rather, *Beauregard* was a precedential order dismissing an appeal because the PTO conceded that "computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. § 101 and must be examined under 35 U.S.C. §§ 102 and 103." 53 F.3d at 1584. This concession probably derived from *Lowry* and, perhaps, *In re Alappat*.

U.S. at 593, 98 S.Ct. 2522. It is incongruous to treat an individual watching a movie containing the signal of claim 14 in real time as any less of an infringer than someone watching the same movie after a short delay using the recording feature of, for example, a TiVo® digital video recorder. A better distinction is made based on the nature of the underlying invention, without regard to the particular way it is claimed. The "utility" requirement of § 101 provides a basis to differentiate patentable inventions involving the manipulation or transmission of information from unpatentable inventions whose only utility lies in the particular information they convey—often a difficult line to draw in computer-related arts.

A final word is in order about *Alappat* and *State Street Bank*. *Alappat* recognized that "a general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software." 33 F.3d at 1545. *State Street Bank* found patentability in a software system which essentially applied a mathematical algorithm to the implementation of a business method. 149 F.3d at 1375-77. In neither case was there any dispute about whether the real innovation lay in particular and unpatentable information, nor was there any question as to whether the inventions represented principles that too closely reflected the laws of mathematics and nature to be "new." In both cases, however, the claimed inventions achieved real-world results with sufficient directness and specificity to be "useful" as that term is used in § 101.

From these observations, it can be appreciated that, consistent with *Flook*, the outer limits of statutory subject matter should not depend on metaphysical distinctions such as those between hardware and software or matter and energy, but rather with the requirements of the patent statute: is an invention a "process," "machine," "manufacture," or "composition of matter," and is it "new" and "useful"?

III. Is a "Signal" Patentable Subject Matter?

Following this analysis, it is my view that Nuijten's claim 14 is directed to a new and useful manufacture.[7]

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7. In applying my proposed definitions for each of these terms, I express no opinion as to whether an invention can be a "manufacture," or for that matter whether it can be "useful" within the meaning of 35 U.S.C. § 101 and Article I, clause 8 of the Constitution, without having some discernible effect upon the world or effecting some physical transformation. *Cf. Comiskey*, 499 F.3d at 1376 (agreeing with the PTO's argument that a method claim qualifies as a "process" only if it (1) is "tied to a particular apparatus" or (2) "operate[s] to change materials to a 'different state or thing' "); *see also Ex parte Bilski*, Appeal No.2002-2257, slip op. at 32 (B.P.A.I. March 8, 2006) (holding that "a 'process' under § 101 requires a transformation of physical subject matter to a different state or thing."). As the majority holds, Nuijten's signal must be detectable to be a "signal." Nor do I express an opinion as to whether "useful" may mean "technological" and thereby require either a result or an art that is technological in character. *See Comiskey*, 499 F.3d at __, slip op. at 14 (observing that "the framers consciously acted to bar Congress from granting letters patent in particular types of business," as compared with the monopolies granted

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Claim 14 is directed to a "manufacture" because the signal is, in the broad sense discussed above, an "article," "produc[ed] . . . for use from raw or prepared materials by giving to these materials [a] new form[ ]." *See Chakrabarty*, 447 U.S. at 308, 100 S.Ct. 2204. Put differently, it is a product of human "art," or ingenuity; it is an application of technology to provoke some purposeful transformation in the real world. Any contrary conclusion must depend on a too-literal reading of either "article" or "material," neither of which appears in the statute, and neither of which any precedent—until today—has imposed as a limitation on the otherwise "expansive" scope of § 101. No matter what form the signal of claim 14 may take, it must involve "*some* physical carrier of information" that is created or manipulated through human activity, and that physical carrier must function "to convey information to a recipient"—it must signal. *See* Majority Op. at 1352-53.

Moreover, claim 14 is not directed to an abstract mathematical or scientific principle that fails to qualify as "new" under *Funk Bros.* and *Benson*. The claimed

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by the English Crown). *But see Lundgren*, 2004 WL 3561262, *5, 2005 Pat.App. LEXIS 34, at *11 ("Our determination is that there is currently no judicially recognized separate 'technological arts' test to determine patent eligible subject matter under § 101."). The precise contours of these doctrines, particularly applied in the context of software and the virtual worlds it may create, pose difficult questions for other days and other cases.

signal is artificial in character. The original input signal is "encoded in accordance with a given encoding process," causing it to undergo at least two transformations required by the language of the claim: first, "selected samples of the signal" are made to represent a second stream of "supplemental data"; and second, in order to reduce the impact of the first transformation, "at least one of the samples preceding the selected samples" is made to be "different from the sample corresponding to the given encoding process." These transformations may apply various laws of physics or mathematics, but they cannot be said to be mere representations or principles of them; neither one is a natural or pre-existing way in which two streams of data may combine, for instance. The signal itself is man-made.

The signal is also "useful" in a direct and specific way. The invention is directed to encoding and communicating data, and that is precisely what the signal does. Any information that it conveys is wholly distinct from the invention itself; the signal is an information carrier, not an attempt to claim information itself. Moreover—though my analysis does not rely on this fact—the claim construction that we unanimously adopt today requires that the signal have a physical manifestation that is directly linked to its purpose. Whether a smoke signal, a sound, or a set of encoded and perhaps encrypted bits traveling across a wireless network in the form of radio waves, a signal must be detectable in order to successfully signal anything. No intermediate steps, layers of interpretation, or

speculative eventual uses separate the signal from the claimed purpose: simply put, the signal signals.

The correctness of these conclusions is supported also by the Supreme Court's decision in a surprisingly analogous case from over 150 years ago, *O'Reilly v. Morse,* 56 U.S. (15 How.) 62, 14 L.Ed. 601 (1853). In *Morse,* Samuel Morse (of Morse code fame) was allowed a patent "for a process of using electromagnetism to produce distinguishable signs for telegraphy." *Benson,* 409 U.S. at 68, 93 S.Ct. 253 (discussing *Morse,* 56 U.S. (15 How.) at 111). The Supreme Court disallowed Morse's eighth claim, for the use of "electromagnetism, however developed for marking or printing intelligible characters, signs, or letters, at any distances," as the impermissible patenting of a scientific principle. *Morse,* 56 U.S. (15 How.) at 112. As the Court later reiterated in The *Telephone Cases,* however, claims to specific uses of electromagnetism were patentable: "The effect of that decision [*Morse*] was, therefore, that the use of magnetism as a motive power, without regard to the particular process with which it was connected in the patent, could not be claimed, but that its use in that connection could." 126 U.S. 1, 534, 8 S.Ct. 778, 31 L.Ed. 863 (1888). In particular, the Court permitted Morse's fifth claim, to the use of telegraphy to convey Morse code: "the system of signs, consisting of dots and spaces, and of dots, spaces, and horizontal lines, for numerals, letters, words, or sentences, substantially as herein set

forth and illustrated, for telegraphic purposes." 56 U.S. (15 How.) at 86.[8]

The "system" and constituent "signs" of Morse's fifth claim are not "tangible articles or commodities." *See* Majority Op. at 1356. Rather, the claim is directed to a signal—a particular way of encoding information so that it can be conveyed (in this case in the form of electrical impulses on a telegraph wire) in a useful manner at a distance. Morse's signaling system conveyed certain important parts of a message—"numerals, letters, words, or sentences," but not lowercase letters, pictures, sound, etc.—under a particular set of constraints. Nuijten's signal does the same—it conveys two streams of data, one primary stream and one lower-bandwidth "supplemental" stream—in a manner such that the supplemental stream is conveyed losslessly, and the primary stream is conveyed so as to minimize the effects of lost bits upon certain underlying encodings of data. Both Morse's signal and Nuijten's are "new" and "useful," and both are patentable.

IV. Conclusion

For these reasons, I would reverse.

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8. Intriguingly, Morse's claim was permitted as an "art" rather than a "manufacture." 56 U.S. (15 How.) at 101. *See supra* at 1360 & n. 3.

APPENDIX B — OPINION OF THE U.S. PATENT AND TRADEMARK OFFICE BOARD OF PATENT APPEALS AND INTERFERENCES DECIDED JANUARY 24, 2006

Ex parte Nuijten

U.S. Patent and Trademark Office Board of Patent Appeals and Interferences

Appeal No. 2003-0853

Decided January 24, 2006 (Nonprecedential)

Before Hairston, Barrett, and MacDonald, administrative patent judges.

Barrett, J.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 5, 6, and 11-24. Claims 2-4 and 7-10 are objected to.

We affirm-in-part.

BACKGROUND

The invention relates to a method and arrangement for embedding supplemental data in a signal, a signal with embedded supplemental data, and a storage medium having stored thereon a signal with embedded supplemental data.

Appendix B

Claims 1, 14, and 15 are reproduced below.

1. A method of embedding supplemental data in a signal, comprising the steps of:

encoding the signal in accordance with an encoding process which includes the step of feeding back the encoded signal to control the encoding; and modifying selected samples of the encoded signal to represent the supplemental data prior to the feedback of the encoded signal and including the modifying of at least one further sample of the encoded signal preceding the selected sample if the further sample modification is found to improve the quality of the encoding process.

14. A signal with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the Supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.

15. A storage medium having stored thereon a signal with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.

Appendix B

THE REFERENCES

The examiner relies on the following references:

THE REJECTIONS

Claims 14, 15, and 22-24 stand rejected under 35 U.S.C. § 101 as being directed to nonstatutory subject matter.

Claims 1, 5, 6, and 11-24 stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-3, 8, 10, 11, 12, 15, 17, and 19-25 of Bruekers in view of Bender.

We refer to the final rejection (Paper No. 11) (pages referred to as "FR__") and the examiner's answer (Paper No. 16) (pages referred to as, "EA__") for a statement of the examiner's rejection, and to the brief (Paper No. 15) (pages referred to as "Br__") and reply brief (Paper No. 17) (pages referred to as "RBr__") for a statement of appellant's arguments thereagainst.

OPINION

Nonstatutory subject matter

The examiner states that the claims are directed to nonstatutory subject matter because (FR3): "The recitation of the data characteristics of a signal is not a practical application within the technological arts. The recited characteristics are a description of the signal

itself and not a process that can be performed by a computer when imparted with the requisite functionality."

Appellant argues that the examiner has not provided any reference or other support for his position and without such reference or other support, the rejection is legally insufficient and thus improper (Br4). It is noted that MPEP § 2106 IV.B.1(c) states that "a signal claim directed to a practical application is statutory regardless of its transitory nature." Appellant argues that the signal is humanly designed and cannot be considered a nonstatutory natural phenomenon (Br4). It is argued that the signal is directed to a practical application (Br5).

The examiner responds that (EA3): (1) "[T]he claims are directed to a signal and not a process"; (2) "Even if the process is statutory, by claiming the signal per se, applicant is seeking to patent an abstract idea or a form of an abstract idea. . . . The signal claimed is a representation of an abstract idea. It is an idea of how to describe an abstract manipulation."; (3) "The claims do not seek the protection of a physical product or manufacture, but the idea expressed by the term 'signal with embedded supplemental data.'"; and (4) "The signal does not represent functional descriptive language that if imparted to a computer would cause a computer to implement a process or become a specialized machine."

Appellant replies that arguments (2) and (3) are new grounds of rejection which are improper, but appellant

nevertheless replies to all four arguments. It is argued that argument (1) is not an argument but rather a restatement of the issue (RBr3). It is argued with respect to argument (2) that a signal is not abstract, but "[s]aid signal comprises energy, is detectable, and measurable . . . [and] is as physical and tangible as a table or a baseball" (RBr4) and is not naturally occurring. It is argued with respect to argument (3) that "the signal of claims 14 and 15 is not an idea but is tangible, detectable, measurable, and humanly created" (RBr4). It is argued with respect to argument (4) that the examiner has not provided any reference or other support for his contention (RBr4). Appellant again asserts that the relevant criterion is that "a signal claim directed to a practical application is statutory regardless of its transitory nature," MPEP § 2106 IV. B.1(c).

Claims 14 and 22-24

First, we must interpret the claims. Claim 14 is directed to a "signal" having certain characteristics. A man-made signal represents coded information. A signal can be an abstract quantity describing the information *or* a physical quantity (e.g., the fluctuations of an electrical quantity, such as voltage), which can be measured. *See In re Walter*, 618 F.2d 758, 770, 205 USPQ 397, 409 (CCPA 1980) ("The 'signals' processed by the inventions of claims 10-12 may represent either physical quantities or abstract quantities; the claims do not require one or the other"). The signal of claim 14 is not recited to have any specific physical form, i.e., it is not expressly or impliedly an electrical or electromagnetic

signal or a signal transmitted or stored in a physical medium. The signal could simply be a string of ⇐1 and -1 sample values representing an encoded signal z, e.g., -1, ⇐1, -1, ⇐1, ⇐1, -1, etc. for the encoded signal z in appellant's Fig. 4, but the representation of the signal is not claimed. Claim 14 merely recites the abstract properties of the signal. Appellant's assertion that "[s]aid signal comprises energy, is detectable, and measurable . . . [and] is as physical and tangible as a table or a baseball" (RBr4) is not supported by any claim limitations.

The same interpretation applies to claim 22, which merely defines the data. Claim 23 recites that "the signal is a video signal" and claim 24 recites that "the signal is an audio signal." The terms "video" and "audio" are considered statements of intended use for the signal and while the terms imply some additional formatting for use in video and audio devices, they do not clearly specify any physical properties. In any case, it is not clear that a physical signal *per se* is patentable.

> We conclude that the signal of claims 14 and 22-24 is nonstatutory subject matter because (1) it is an abstract idea, and (2) it does not fall within one of the four statutory categories of subject matter under 35 U.S.C. § 101. These roughly correspond to the examiner's arguments (2) and (3), respectively. The examiner's refers to "technological arts," but technological arts is not a separate test for statutory subject matter. *See Ex parte*

Lundgren, 76 USPQ2d 1385 (Bd. Pat. App. & Int. 2005). This is not to say that there are no limits on patentable subject matter. *See id.* at 1389-1432 (APJ Barrett, concurring-in-part and dissenting-in-part) (inventions protected under the "useful arts" of the Constitution are specified by Congress in the classes of § 101, as those classes are defined by the caselaw, not by some undefined "technological arts" test).

Abstract idea

One of the three judicially recognized exceptions is an "abstract idea." *Diamond v. Diehr*, 450 U.S. 175, 185, 209 USPQ 1, 7 (1981). The signal of claims 14 and 22 has no physical attributes and merely describes the abstract characteristics of the signal and, thus, it is considered an "abstract idea." Claim 23, which recites that "the signal is a video signal," and claim 24, which recites that "the signal is an audio signal," are interpreted as reciting the type of information contained in the signal, video or audio, and not any particular physical properties, such as an electrical signal. Accordingly, the signal of claims 14 and 22-24 is nonstatutory subject matter as an "abstract idea."

Not within a § 101 category

The categories of statutory subject matter are "process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. "[N]o patent is available for a

discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101." *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483, 181 USPQ 673, 679 (1974).

A "process" is a series of acts and, since claim 14 does not recite acts, it is not a process.

The three product classes of machine, manufacture, and composition of matter have traditionally required physical structure or substance. "The term machine includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." *Corning v. Burden*, 56 U.S. 252, 267 (1854); *see also Burr v. Duryee*, 68 U.S. 531, 570 (1863) (a machine is a *concrete* thing, consisting of parts or of certain devices and combinations of devices). In modern parlance, electrical circuits and devices, such as computers, are referred to as machines. The signal of claim 14 has no concrete tangible physical structure, and does not itself perform any functions that produce useful, concrete and tangible results. Therefore, a signal does not fit within the definition of a "machine."

A "manufacture" and a "composition of matter" are defined in *Diamond v. Chakrabarty*, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980):

> [T]his Court has read the term "manufacture" in accordance with its

> dictionary definition to mean "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." *American Fruit Growers. Inc. v. Brogdex Co.*, 283 U.S. 1, 11 [8 USPQ 131 *Shell Development Co. v. Watson*, 149 F.Supp. 279, 280 [113 USPQ 265.

The signal is not composed of matter and is clearly not "composition of matter."

A "manufacture" is the residual category for products. 1 Chisum, *Patents* § 1.02[3] (2004) (*citing* W. Robinson, *The Law of Patents for Useful Inventions* 270 (1890)). If a signal falls within any category of § 101, it must fall within this category. The definition of "manufacture" from *Diamond v. Chakrabarty* requires a tangible article prepared from materials. The other cases dealing with manufactures also require a tangible physical article. The CCPA held in *In re Hruby*, 373 F.2d 997, 153 USPQ 61 (CCPA 1967) that there was no distinction between the meaning of "manufacture" in § 101 and "article of manufacture" in § 171 for designs. The issue in *Hruby* was whether that portion of a water fountain which is composed entirely of water in motion was an article of manufacture. The CCPA relied on the analysis of the term "manufacture" in *Riter-Conley Mfg. Co. v. Aiken*, 203 F. 699 (3d Cir.), *cert. denied*, 229 U.S. 617 (1913), a case involving a utility patent. The CCPA stated in *Hruby*:

> The gist of it is, as one can determine from dictionaries, that a manufacture is anything made "by the hands of man" from raw materials, whether literally by hand or by machinery or by art.

373 F.2d at 1000, 153 USPQ at 65. The CCPA held that the fountain was made of the only substance fountains can be made of—water—and determined that designs for water fountains were statutory. Articles of manufacture in designs manifestly require physical matter to provide substance for embodiment of the design. Since an "article of manufacture" under § 171 has the same meaning as a "manufacture" under § 101, it is inevitable that a manufacture under § 101 requires physical matter.

Some further indirect evidence that Congress intended to limit patentable subject matter to physical things and steps is found in 35 U.S.C. § 112, sixth paragraph, which states that an element in a claim for a combination may be expressed as a "means or step" for performing a function and will be construed to cover the corresponding "structure, material or acts described in the specification and equivalents thereof." "Structure" and, "material" indicate tangible things made of matter, not energy.

The signal of claim 14 does not have any physical structure or substance and does not fit the definition of a "manufacture" which requires a tangible object. The signal of claims 14 and 22-24 is considered an "abstract

idea," as discussed *supra*. The more interesting question is presented with respect to dependent claims 23 and 24, to the extent these claims might be construed to imply an electrical signal: Is a physical electrical signal, not embodied or stored in a tangible medium, a "manufacture"? An electrical signal does not fit the *Diamond v. Chakrabarty* definition of a manufacture because it is not an object prepared from material and, thus, the answer seems to be that a signal, even if claimed as a measurable physical quantity, such as a voltage, is not patentable. *See In re Bonczyk*, 10 Fed. Appx. 908 (Fed. Cir. 2001) (unpublished) ("fabricated energy structure" does not correspond to any statutory category of subject matter and it is unnecessary to reach the alternate ground of affirmance that the subject matter lacks practical utility). This analysis is consistent with the *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility*, 1300 Off. Gaz. Patent and Trademark Off. (O.G.) 142, 152 (Nov. 22, 2005), in the section entitled "Electro-Magnetic Signals." Rather than invent reasons why this different type of subject matter may be statutory and open up a whole new type of subject matter for patenting, we leave it to our reviewing court, the U.S. Court of Appeals for the Federal Circuit to make this decision. In summary, the signal of claims 14 and 22-24 is also unpatentable subject matter because it does not fall within any category of § 101.

Appellant relies on the following statement in MPEP § 2106 IV.B.1(c) (8th ed., Rev. 1, Feb. 2003): "However, a signal claim directed to a practical application of

electromagnetic energy is statutory regardless of its transitory nature. See *O'Reilly*, 56 U.S. at 114-19; *In re Breslow*, 616 F.2d 516, 519-21, 205 USPQ 221, 225-26 (CCPA 1980)." To the extent this statement suggests that a claim to a signal *per se* is statutory subject matter, it is in error. Neither *O'Reilly v. Morse* nor *Breslow* are to the contrary: *O'Reilly* was to a method and *Breslow* was to a chemical composition of matter. It is noted that the rejection in this case is based principally on the fact that the signal, as claimed, is abstract and is not recited to be an electromagnetic signal or a signal stored in a physical medium. Nevertheless, we hold that an electrical signal *per se* does not fit within any of the statutory categories of 35 U.S.C. § 101 until told otherwise by the Federal Circuit. As to the statement in the MPEP, the MPEP is a manual of examining *procedure* and its legal interpretations of the case law are not binding on the Board. The practical application of a signal in a process or manufacture may be statutory, but here the claims recite a signal *per se*.

The assignee of this application should be familiar with the signal analysis. A rejection of a signal *per se* was affirmed by the Board in Koo, U.S. Patent 5,568,202, issued October 22, 1996, and assigned to U.S. Philips, the assignee of the present application. In Koo, after a premature appeal to the Federal Circuit, the claims were allowed after the claim was amended to recite "wherein said reference signal is embodied in a processor readable memory" following the holding in *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994), wherein claims to a data structure stored in memory were held to be

statutory subject matter. No memory or other physical structure is claimed here and our decision is not controlled by *Lowry*.

As to the examiner's statement that "[t]he signal does not represent functional descriptive language that if imparted to a computer would cause a computer to implement a process or become a specialized machine" (EA3). This is apparently a reference to the distinction between "functional descriptive material" and "nonfunctional descriptive material" in MPEP § 2106 IV. B.1. This rationale is relevant to claim 15, but is not necessary for claim 14, which does not recite a memory or storage medium.

Claim 15

Claim 15 recites "a storage medium having stored thereon a signal with embedded supplemental data." This claim depends on the distinction between "functional descriptive material" and "nonfunctional descriptive material" described in MPEP § 2106 IV.B.1. "'Nonfunctional descriptive material' includes but is not limited to music, literary works and a compilation or mere arrangement of data." *Id.* While the signal may represent "nonfunctional descriptive material," music or a movie, claim 15 is not trying to claim the content of the material itself. The storage medium in claim 15 nominally puts the claim into the statutory category of a "manufacture"

and the signal is "functional" because it can be used by a machine to produce a useful result, as with the "data structure stored in memory" in *Lowry*. Accordingly, we conclude that claim 15 is statutory subject matter. The rejection of claim 15 is reversed.

Obviousness-type double patenting

The examiner finds that assignee's patent to Bruekers claims the claimed invention except for the limitation of modifying at least one further sample of the encoded signal preceding the selected sample if the further sample modification is found to improve the quality of the encoding process and the limitation that at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process (FR3- 4). The examiner finds that Bender teaches a method and apparatus for hiding data wherein samples preceding the selected samples are modified in order to improve the quality of the encoding process at column 2, lines 35-46 (Br4).

Appellant presents numerous arguments in response (Br7-20).

The examiner responds (EA5):

The patent to Bender teaches the modification of the samples around or preceding the location where the watermark is introduced, see column 8, lines 25-39, referring to Figure 2. The Bender patent teaches the

modification of samples preceding (around) the selected samples improves the quality of the encoding process, i.e., the ability to hide a watermark, se [sic] column 1, lines 27-38.

Appellant presents numerous arguments in rebuttal (RBr8-11).

Appellant's argument that the examiner did not identify a specific claim in Bruekers against the independent claims of this application (Br8-10), while true, is not the kind of argument that is persuasive given that appellant is a co-inventor on Bruekers and is presumed to be familiar with what is claimed and the fact that the examiner identified what was not taught. The claims are not complex and it takes little time to determine that claim 1 or claim 22 in Bruekers discloses the limitations of the independent claims of the present application except for modifying a further sample of the encoded signal preceding the selected sample (claims 1 and 11) or at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process (claims 14 and 15). The limitations of claims 5, 6, 12, and 13 of the present application are found in claims 2 and 3 of Bruekers. Appellant's argument has merit for some dependent claims of the present case, such as claims 16, 19, and 22, which recite the "supplemental data includes a portion of a watermark data pattern," and claims 17, 18, 20, 21, 23, and 24, which recite that the signal is an audio or video signal, because these limitations are not found in the claims in Bruekers and

the examiner has not attempted to explain why the limitations would have been obvious.

> We agree with appellant that Bender does not disclose modifying a further sample of the encoded signal preceding the selected sample (claims 1 and 11) or that at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process (claims 14 and 15). It appears that the examiner interprets the claim term "preceding" to be taught by the modification of samples "around" the selected samples in Bender. This is not the encoding of a signal with feedback and modification of a sample preceding the selected sample called for in the claims. An electrical signal is a one-dimensional entity, e.g., it has a unique value (voltage, frequency, or, in the present case a value of ≤ 1 or -1) as a function of time. Bender is directed to embedding supplemental data in a two dimensional image. While the image will be encoded somehow for transmission, the method of encoding is not disclosed. The term "preceding" has meaning for a signal which is a function of time but is meaningless for an image; it does not equate to "around" in a two-dimensional image. Certainly, there is no way the unity bit encoding or sigma-delta modulation of, for example, claims 5 and 6 makes any sense for Bender. Thus, the

examiner has failed to establish a *prima facie* case of obviousness-type double patenting. The rejection of claims 1, 5, 6, and 11- 24 is reversed.

CONCLUSION

The rejection of claims 14 and 22-24 under 35 U.S.C. § 101 is sustained. The rejection of claim 15 under § 101 is reversed.

The rejection of claims 1, 5, 6, and 11-24 based on obviousness-type double patenting is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1). *See* 37 CFR § 1.136(a)(1)(iv) (2004).

AFFIRMED-IN-PART

APPENDIX C — ORDER OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT DENYING PETITION FOR REHEARING EN BANC DATED FEBRUARY 11, 2008

UNITED STATES COURT OF APPEALS
FEDERAL CIRCUIT

No. 2006-1371.

In re Petrus A.C.M. NUIJTEN.

Feb. 11, 2008.

Before MICHEL, Chief Judge, NEWMAN, MAYER, LOURIE, RADER, SCHALL, BRYSON, GAJARSA, LINN, DYK, PROST, and MOORE, Circuit Judges.

LINN, Circuit Judge, with whom NEWMAN and RADER, Circuit Judges, join, dissents from the denial of the petition for rehearing en banc.

ORDER

PER CURIAM.

A petition for rehearing en banc was filed by the Appellant, and a response thereto was invited by the court and filed by the Director of the United States Patent and Trademark Office. The petition for rehearing was referred to the panel that heard the appeal, and thereafter the petition for rehearing en banc and response were referred to the circuit judges who are authorized to request a poll whether to rehear the appeal en banc. A poll was requested, taken, and failed.

Upon consideration thereof,

IT IS ORDERED THAT:

(1) The petition for panel rehearing is denied.

(2) The petition for rehearing en banc is denied.

(3) The mandate of the court will issue on February 19, 2008.

LINN, Circuit Judge, with whom NEWMAN and RADER, Circuit Judges, join, dissenting from the denial of the petition for rehearing en banc.

I respectfully dissent from the court's decision not to rehear this case en banc. As I explained in my dissent from the panel opinion in this case, our decision conflicts with our own precedents as well as those of the Supreme Court. *See In re Nuijten,* 500 F.3d 1346, 1358 (Fed.Cir.2007) (Linn, J., concurring-in-part and dissenting-in-part). It conflicts with our own precedent because our predecessor court's decision in *In re Breslow,* 616 F.2d 516 (C.C.P.A.1980), forecloses the majority's conclusion, *see Nuijten,* 500 F.3d at 1356, that something "transient" or "fleeting" cannot constitute a "manufacture" under 35 U.S.C. § 101. And it conflicts with Supreme Court precedent because it ignores the Supreme Court's analysis of how, in general terms, § 101 is to be construed. As the Court discussed in *Diamond v. Chakrabarty,* patentable subject matter

includes "anything under the sun that is made by man" except for certain enumerated exceptions: "The laws of nature, physical phenomena, and abstract ideas have been held not patentable." 447 U.S. 303, 309, 100 S.Ct. 2204, 65 L.Ed.2d 144 (1980). The majority's narrow construction of "manufacture" ignores this framework.

In addition, this case raises important questions about the relationship between § 101 and § 103. In this case, we affirm the PTO's rejection of claims to a signal *simpliciter,* but the PTO has allowed a claim to a storage medium containing the very same signal, on the grounds that the storage medium is a manufacture that can be rejected, if at all, only under some provision other than § 101. In particular, the PTO considers the patentability of such claims under the "printed matter" doctrine of § 103. *See In re Lowry,* 32 F.3d 1579 (Fed.Cir.1994). These distinctions make no practical sense and are poorly supported by precedent, which, to the contrary, requires a more holistic approach to the question of whether a claim is directed only to an unpatentable abstraction or whether it is directed to a patentable application of such an abstraction to an otherwise statutory invention. *Cf. Parker v. Flook,* 437 U.S. 584, 591, 98 S.Ct. 2522, 57 L.Ed.2d 451 (1978) ("The process itself, not merely the mathematical algorithm, must be new and useful."); *cf. also In re Abele,* 684 F.2d 902, 909 (C.C.P.A.1982) ("As was the case in *[Diamond v.] Diehr*[, 450 U.S. 175, 101 S.Ct. 1048, 67 L.Ed.2d 155 (1981),] . . . the algorithm is but a part of the overall claimed process."). The

distinctions that are drawn between signals and storage media containing those signals would appear to apply equally to the distinctions between software and hardware and are artificial at best.

For these reasons, I would rehear this case en banc.